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COMMUNICATION WITH SIBERIA BY SEA.

Few will deny that our great development of commerce is principally, if not entirely, due to geographical discovery, for wherever new countries of a productive character are found out, commerce and trade are sure to follow, and, what is undoubtedly most important of all, the work of civilisation is advanced. The road to success in science is by experiment, perseverance, and unwearied exertion. Pretty much the same is the path for the geographical explorer, who in addition is called on to bear greater hardships, physical and mental, and run greater risks; but it is pleasing to note that the results in both these departments of inquiry are ultimately for the benefit and elevation of humanity.

For many years I have been impressed with the idea that commerce to an immense extent could be carried on between Siberia and Western Europe *viâ* the Kara Sea, and the mighty rivers Ob and Yenisei. These rivers penetrate some 2500 miles into the heart of Siberia and to the confines of China; a high road even to Japan could be opened by Lake Baikal and the Rivers Selenga and Amur, where trade by water transit is already carried on to a large extent by Russia. By the Kara Sea route, the mineral wealth on the slopes of the vast Ural Mountains, the produce of the immense forests and agricultural districts of Central and Southern Siberia, together with the valuable fur and fish trade of Northern Siberia, could be turned into the channel in question, which is but some twelve days' steaming from England, or similar to an Archangel voyage. There could not be the slightest doubt of the importance of this route, and my idea was strengthened by the fact that, some three centuries ago, such famous heroes and explorers as Sir Hugh Willoughby, Chancellor, and Petts, and the brave Dutch Captain Barents, attempted to demonstrate the problem of finding their way to Japan by the north-eastern route inside the Kara Sea. At this period the Russians were and had been for many years engaged in an extensive trade from Archangel to the Ob and Yenisei *viâ* the Kara Sea. This was accomplished by wretched flat-bottomed boats, sewn together with willow twigs, called kotchkies; and under these difficulties they skirted the Samoyede land or southern coast of the Kara Sea, passing in through the Waygat and Pett Straits, thence crossing the Biadarata Gulf to the River Yurubei, proceeding up that river until they came to two lakes, which were reported to nearly join the River Selenoi, which river was said to enter the Gulf of Ob near the Gulf of Taz, where a large town by the name of Mangasee existed. Occasionally these frail craft were known even to reach and ascend the Yenisei. What might not be done, therefore, with our improved steamers of the present day? They now annually do battle with the mighty ice of Davis Straits, Smith's Sound, &c., in comparative safety.

No modern expedition, to my knowledge, had ever reached the Ob and Yenisei by this Kara Sea route; nevertheless, as I was on the point of sailing, I received information from Dr. Petermann, of Gotha, that on several occasions for a few years past Norwegian vessels of very frail construction were in the habit of resorting to these seas for walrus and seal hunting, and that Capt. Carlsen had actually succeeded in circumnavigating Novaya Zemlya; and he further reported that the merchants of the Rivers Yenisei and Ob were quite alive to the importance of the route, inasmuch as a merchant named Siderof had offered £2000 to the first vessel that should communicate with the Ob and Yenisei. His offer, as far as I know, had never been accepted, and perhaps this is not surprising, because high authorities in Arctic matters, whom I often consulted, were anything but sanguine on the matter. It is true that some few agreed that it might be possible to communicate with those rivers, but a great number deemed the ice an insuperable difficulty. I was also warned that the Russian Government was not in favour of commerce being carried on by that route, owing to the fact that the land was one of exile.

As to the fear about the ice, I believed it would not prove so formidable, and for this reason: the warm waters of the Gulf Stream and equatorial currents which were known to pass round the North Cape on towards Novaya Zemlya would in all probability find their way into the Kara Sea by the Waygat and Pett Straits, and thus meeting and driving the ice before it to the northward, would cause at least the southern part of the Kara Sea to be open for several months in the year; and it will be seen hereafter that my views on this point were correct.

With regard to the difficulty about the Russian Government, I felt sure if it became convinced that commerce could be carried on by this route, enriching so valuable a tract of country as Eastern Siberia, it could soon discover other means of disposing of its exile population by removing them further eastward into the vast regions of Eastern Siberia, if necessary.

Apparently the most valid argument against the scheme related to the ice, but, as experience has shown, this does not amount to much, the Kara Sea being open as long on an average as the Hudson's Bay is to the westward; and I may here say that to me it seems a mournful fact that such a vast commerce should lie dormant for want of ordinary enterprise. To the north-westward, the Hudson's Bay Company trade successfully for some two or three months every summer in quite as unfavourable districts as these, and it pays them well to keep up at an enormous expense, in these territories, ports, stores, staffs of superintendents, and servants, &c., and a fleet of most expensive "Arctic" or ice steamers to do battle with the dread ice of those regions, and this only for one kind of commerce, viz., the fur trade; whilst the Kara Sea route combines with this all other kinds of trading, together with a grand market outwards for our own manufactured goods.

I may state, for the benefit of those who may be sceptical as to the prospects of this "mighty commerce," that the fur trade is one which will vie with any other part of the world. Then the rivers are one living mass of fish; and the art of fishing in this quarter is not to secure as great a "haul" at a time as possible, but rather how best to avoid this, from the fact that one-third of the nets are lost annually by the heavy draughts of fishes. The fish are of the richest quality, and consist of sturgeon, salmon, stirlet, pike, perch, bream, a splendid quality of herring, and many other of the most valuable kinds, only known to me by their Russian names.

Then there are other valuable commodities. The Ob, which skirts the eastern side of the Urals, is exceedingly rich in minerals, while the Yenisei has its gold, silver, iron, and copper mines. There is also graphite and other minerals. The forests are magnificent, and there are immense tracts of agricultural land, which, in the event of extended commerce, could supply all Western Europe with wheat, linseed, oats, barley and other cereals. The basin of the Ob especially is of the richest kind, owing to the fact of its overflowing its banks annually, and leaving a rich deposit in the same manner as the Nile. I may also state that my late overland journey from the Yenisei has made me aware of the fact that the people in these regions want every kind of manufactured article that can be procured from our country, and that in such large cities as Irkutsk, Tomsk, Omsk, Tumien, &c., where there are many of the wealthiest of gold merchants, and others, the demand for such luxuries would be great.

Goods from Europe, and teas, &c., from China, are now being transported by the tedious and most expensive overland route. It costs on an average from Moscow to such a place as Irkutsk as much as £20 a ton—a price which is almost sufficient to prohibit trade, except to the wealthier classes. By the new route raw produce could be transported at the rate of one-fifth this amount, and at the same time affording handsome profits.

Before going further, it may be as well for me to corroborate these statements as to the productiveness of this part of our globe by quoting from a paper, entitled "The Riches of Siberia," read at the Congress of the Geographical Sciences, held at Paris, August 5, 1875, by M. F. de Lesseps. "This country" (Siberia), he said, "the richest of the entire world under the triple produce of the vegetable, mineral, and animal kingdoms, divides itself politically, as you know, into two great parts—West Siberia and East Siberia; and geographically it is divided from the north to the south into three great regions—the regions of wheat, of forests, and of fishing and hunting. The mineral kingdom extends over all these regions, which are hardly cultivated. To draw means from all the riches and all these products yet buried in the ground or swamps lying in these regions where they are so cheap, where workmanship is almost for nothing; to bring all this untold wealth into relation with Europe and the entire world has been for a number of years the aim of the Government and of hardy and stubborn explorers, and for which they laboured with an energy worthy of the undertaking. Nature makes no mistakes, and everywhere offers to enlightened human intelligence the true means for such as are able to discover them. It is from the south to the north that flow the numerous and magnificent rivers, to which only those of South America can be compared, by which all Siberia is furrowed, forming a vast fan which widens in the interior of the country to the great advantage of her vegetation and her inland commerce. Throughout the whole length of the eastern declivity of the Urals, we have her magnificent pendant the 'Ob,' which, with her confluent the 'Irtish,' forms an immense stream of navigable water as far as China. The only problem to be solved, in order to direct the commerce of the aforesaid regions of Siberia into Europe by the natural ways of that country and Northern Russia, is therefore to find a direct way of communication by sea."

In the summer of 1874 I determined to test the correctness of my views by this new route. Accordingly I hired the Arctic steamer 'Diana,' and sailed from Dundee on June 3rd. On the 27th of the same month we passed the Waygat Straits, or the dreaded "Iron Gates" as they are called, sailed along the southern shore of the Kara Sea or Samoyede Land in from 10 to 11 fathoms of water, there being no ice to impede our progress under sail alone, never having needed the use of steam from leaving the vicinity of Hammerfest. We spent several weeks in the neighbourhood of Lütke Island and Baidarata Gulf, cruising about with the greatest ease and safety. Landing occasionally, we found the earth one mass of green foliage and flowers, sweet berries of many kinds, eider down, and immense flocks of the eider duck, together with swans and geese on the small inland lakes. No snow was to be seen, except on the highest peaks of the Ural Mountains. From thence, as soon as the ice had passed away from the middle of the Kara Sea, we proceeded to the northward along the Yalmal coast, round by White Island, to the Gulf of Ob, where we arrived on the 5th August. Here we experienced strong head-gales and currents, and my steamer being slow of speed, and great draught of water, I determined after beating about for several days, and the gales not abating, to abandon the attempt of ascending the river with such a vessel, more especially as I had promised, if circumstances permitted, to search for the Austrian Expedition. I therefore, after a short cruise further north, and convincing myself that far beyond all was open water, proceeded south again, passing out through the Waygat Straits, arriving

on the west coast of Novaya Zemlya by the 30th of August, to find that the Austrians had been relieved by a Russian schooner a few days previous. I then made for Hammerfest, where we had the extreme pleasure of meeting the Austrian Expedition. From this port I immediately telegraphed the news that we had sailed the Kara Sea for eight weeks, having reached the Gulf of Ob, and found all open water between it and the Yenisei, and that we could have ascended these rivers had circumstances permitted.

We arrived by the 26th of September at Dundee, where I paid my crew off, and during the winter I gave lectures in several provincial towns, descriptive of my voyage, pointing out the feasibility of this route and its great importance to commerce, appealing to the public to assist me to carry out my ideas, by either forming a company to trade at once or to accomplish the work in any other way. The result of this was that two gentlemen of Sunderland rendered me material aid to fit out another expedition, as I was somewhat crippled in my own resources, having undertaken the first voyage entirely at my own expense.

I purchased a small cutter of not more than 45 feet long, and sailed in this tiny craft direct for the Kara Sea; heavy head-gales and other circumstances, however, prevented me reaching further than Kolgueve Island; north-east gales, increasing in force almost to the verge of a hurricane, compelled me reluctantly to bear up for home in the latter part of August. After a severe passage we arrived safely at the port of Sunderland in the latter part of October, to learn that Professor Nordenskiold, of Stockholm, who following on my track of last year, believing as he did in the theories advanced by me, succeeded in reaching the mouth of the Yenisei with a Norwegian sloop, and had ascended the river in a boat, despatching the vessel back to Norway. On the Professor's return overland to St. Petersburg, I was invited by the merchant Sideroff and the different societies of that city to meet him there. The professor and myself addressed the members of the Societies for the Encouragement of Commerce, &c., and large audiences. The excitement and interest then manifested created a desire for the continuation of these explorations; merchants from the different cities in Siberia, Moscow and St. Petersburg offered to subscribe funds for an expedition under my command. The wealthy gold-mine owner, Alexander Sibiriakof, who had given £3000 towards Nordenskiold's expedition, subscribed £1000 towards mine, and Mr. Gardiner, of this country, subscribed a like sum. I was commissioned by the Imperial Societies for the Encouragement of Commerce and for the Development of Marine Communications to return at once to England and secure a steamer suitable for the work, and they would forward the means. However, before this could be accomplished, jealousies had invaded the Societies, there being members averse to the "foreign element," and desirous that a Russian naval officer should head the expedition. This had the unfortunate effect of causing promised subscriptions to be withheld, M. Sibiriakof being the only gentleman who remained steadfast to his proposal. His money was placed in the hands of the editor of *The Times*. This, coupled with the assistance of Mr. Gardiner, enabled me once more to attempt demonstrating the feasibility of the route. I therefore purchased the screw-steamer 'Thames,' which vessel was strengthened and fitted for Arctic work, and although very inadequate, being of little power and not at all suitable for the undertaking, I managed to fit her out and provision her for about six months. With this vessel I succeeded in freely navigating the Kara Sea for some six weeks, surveying thoroughly the Baidarata Gulf, where I found a commodious harbour under an island on the west shore. I then proceeded to the Gulf of Ob, where heavy gales and strong currents again prevented me from ascending, my vessel having the same drawbacks as the 'Diana,' namely, slow of speed and great draught of water.

During my stay in the Kara Sea, both in 1874 and this last voyage, I succeeded in thoroughly demonstrating the fact that the Gulf Stream and equatorial currents positively flow into this sea. The following temperatures will show this:—5th July, latitude 69° 25′ N.; longitude, 66° 35′; temperature of the air in the shade, 45; ditto in the sun, 65; water surface, 38; density, 4. 11th July, off Lütke Island, temperature of the air in the shade, 37; ditto in the sun, 67; surface of water, 35; density, 4. 23rd July, latitude, 70° 10′ N; longitude, 66° east, lying in the pack ice; temperature of air in the shade, 45; surface of water, 37; density, 1½. 25th July, same latitude and longitude, still lying in the ice; temperature of air in the shade, 55; water surface, 37; density, 1½. 27th August, latitude, 69° 54′ N.; longitude, 65° 10′; temperature of air in the shade, 50; water surface, 47; density, 5. 28th August, Waygat Straits; temperature of the surface water, 50°; density, 4; air, 45 in the shade. 30th August, latitude, 70° 24′ N.; longitude, 48° east; temperature of water surface, 43; density, 5; temperature of air, 43. 31st August, latitude, 70° 30′ N.; longitude, 44° 10′ E.; temperature of the air, 43; water, 43; density, 5½. These two last observations, it will be seen, are far to the westward in the northern seas, and actually demonstrate that the Waygat Straits is warmer by two degrees. During my last cruise, in 1875, I may quote the following from a list of observations:—2nd August, Waygat Straits; temperature of the air in shade, 48; water suface, 50; specific gravity, 25. 3rd August, latitude, 70° N.; longitude, 61° 58′ E.; temperature of the air, 58 in shade; temperature of water at surface, 48½; density, 20; 9th August, latitude, 68° 50′ N.; longitude, 67° 40′ E.; temperature of air in the shade, 55; in the sun, 90; water at surface, 48; density, 20. 27th August, latitude, 69° 42′ N.; longitude, 68° 30′ E.; air in the shade, 60; water at the surface, 49; density, 17.* These high temperatures must be a convincing proof that the Kara Sea receives the heat of the Gulf Stream and equatorial currents. Over the same latitudes in Davis Straits and East Greenland, the water is never beyond the temperature of 1 or 2 degrees above freezing point or + 33 to + 34 at the same season of the year.†

During the whole of my last cruise I succeeded in dredging with great success, but I was compelled to leave these materials and specimens on board my ship, they being too bulky for transport overland in sledges.

* These temperatures were taken with Board of Trade tested thermometers.

† See Markham's *Whaling Cruise to Baffin's Bay.*

I made frequent observations for determining the variation of the compass, and found it to increase rapidly to the eastward as we sailed northward in the Kara Sea. Towards the entrance of the Yenisei it proved to be nearly 2¾ points E. The crew landed at several of the islands and found the earth covered with rich foliage and flowers, the same conditions as were found in 1874. The Gulf of Baidarata was then thoroughly surveyed, searching with the screw-launch for any small rivers that might lead across the Isthmus of Yalmal to the Gulf of Ob. On the west side I found an excellent harbour under the shelter of an island, which I named Gardiner's Haven, and the island I named "Siberiakof Island."

On September 2nd the vessel arrived off White Island, the entrance of the Gulf of Ob, having proceeded there under canvas without the aid of steam, *no ice* impeding my progress. However, heavy headgales prevented me from ascending this gulf, therefore I bore up for the Yenisei, discovering on my route throughout many magnificent islands well clad with verdure and abounding with reindeer. While among these islands I on one occasion took shelter for upwards of five days, hurricanes of wind prevailing the whole time, the ship riding in perfect safety in the smoothest water. From thence I directed my course to the Yenisei, passing on my way magnificent islands containing natural harbours of the most extensive kind, and reindeer in large numbers were to be seen. On the shores of most of these islands driftwood was piled up in monster heaps which contained trees of the largest dimensions, some of which would make masts for the largest of our men-of-war. Most of them were as sound as the day they were lodged there, owing to the preserving power of the climate; and there is no doubt that most of these splendid spars have been lying there for centuries.

A fine northerly gale soon brought us into the vicinity of the first village at the entrance of the Yenisei, which forms a well-sheltered natural harbour for vessels loading in the summer months. I landed here expecting to find records of the merchant Sideroff's vessel that was expected at the mouth of the river with plumbago. On reaching the village I found the few houses composing it roofless and deserted, and observed large troughs lying about, which evidently had been used in the preparation of seal and walrus oil obtained by Russian fishermen in times gone by. The boiling house was in the rear of the building and the best preserved of all. Many foxes were wandering at their leisure on the beach. I should not omit to mention the difficulty we encountered in scaling these formidable barriers of drift wood to reach this village from the beach. Many of these great balks of timber, had never received the pressure of human feet for centuries, and on our stepping on to them several of them that were buried far below, being rotten, gave way, precipitating the surface timber, and the members of the party, who stood in great danger of being buried alive. Finding no records, I advanced up the Yenisei, and the first natives I had the pleasure of holding communication with were found in the village of Sverevo. Here a Russian and two Samoyedes came on board; I interrogated them as to their knowledge of the Swedish expedition, which I expected had ascended some time before. They appeared entirely ignorant of any such having passed up. From here I crossed over to the village of Korepovskoye. The natives of this village informed us that Professor Nordenskiold had not been there—volunteering at the same time to pilot my vessel to Dudinskoe.

After many days of hard labour to discover the channels, I was obliged to dispense with the services of this native, and then, by the aid of my steam-launch, succeeded in finding the only channel in this locality, which was never less than some 3 fathoms deep, and not over half a mile in length. Once over this difficulty, I sailed with the greatest of ease to Dudinskoe, finding the channel good all the way up, never having less than 5 or 6 fathoms of water. Ascertaining that the nearest port or river of safety in connection with the Yenisei was at Kureika, and that by placing the vessel within the entrance of this small river she would be in perfect safety until the breaking up and finally passing away of the ice in the spring, I determined to take my vessel there, and succeeded in reaching the entrance of this river by the 17th of October, and having entered it as far as the water (which was very low) would permit, I succeeded in placing my vessel alongside the bank of the river, and the following two or three days served to fasten her in this position, the ice having formed. The crew being comfortably housed on shore, and Captain Svanberg, who had been sent out to work the plumbago by M. Siderof, having joined me, we left the ship on the 24th of November, and proceeded in sledges to Turuchansk. Here the governor of the village, an over-officious official, committed himself by behaving in a most violent manner towards our party. He seized our sample goods, on the pretence that I had infringed the laws of Russia by giving away on several occasions small articles as presents to those natives who had been so kind to me on my way up the Yenisei. This foolish man proceeded to such an unwarrantable extreme as to threaten Captain Svanberg with imprisonment, or to despatch us to Yeniseisk under an escort of soldiers. Ultimately he became convinced that he was acting improperly, changed his conduct, invited us to dinner, and finally did us the honour of escorting us himself to the next village.

Our journey to Yeniseisk, a distance of 600 miles or more, was resumed. The scenery was occasionally grand in the extreme, and at times we passed through magnificent forests of immense trees, consisting of the fir, the birch, the plane, the cedar, &c. The weather continued clear and beautiful, although intensely cold, the thermometer registering at times 40° below zero. Arriving at Yeniseisk by the middle of December, telegrams were immediately dispatched to England and other places announcing our safe arrival. At this port the *spravnick* or governor, the mayor, merchants, and other inhabitants received me with the utmost kindness and hospitality. On no less than three occasions was I entertained at private *soirées*. The Governor-General of Siberia, having been communicated with, sent orders for the immediate release of the goods, *free of all duty*, which had been detained at Turuchansk, and finally another officer was dispatched to relieve the before-mentioned official in that district of his responsible duties, thus proving that the Russian Government do not wish in any way to impede commerce, but rather to facilitate it in every way. I also

received from the Mayor of St. Petersburg a complimentary telegram, in the name of the Imperial Societies of that city, congratulating me on my success.

Yeniseisk I found to be a town of very great importance, containing upwards of 11,000 inhabitants, many of whom are merchants of the wealthiest class. The town had an exceedingly fine appearance; amongst its many well-built houses were to be seen several large churches with their gilded domes and cupolas, in the true Oriental or Byzantine style of architecture. An extensive trade is carried on at this town in the exchange of goods, consisting of wheat, barley, oats, hides, tallow, teas from China, and many other commodities. Owners of gold mines are also to be found here luxuriating in almost palatial residences. The mixed population consists of the Russian proper, Germans, Poles, Tatars, Jews, and only one Englishman, who had resided in this town upwards of 30 years. This gentleman, Mr. Boiling, is the only shipbuilder on that river, he having built the schooner for Mr. Sideroff's expedition of last summer. The gold mines of these districts are both rich, extensive, and numerous. There are also copper and iron mines.

Leaving here I journeyed on to Krasynoarsk, where I received a hearty reception from the Governor, who rendered me all the aid in his power, furnishing me with a government padarojina or pass for engaging horses on the road. This government pass constituted me a courier, who took precedence of everything on the road, even the mail, the consequence being that I was forwarded with the utmost despatch, travelling night and day, only stopping for a single night at such towns as Omsk, Tomsk, and Tumein. At Omsk the Governor-General of Western Siberia received me in the most hospitable manner, entertaining me to dinner, and giving me the most valuable information concerning the Ob and its estuary, and the mode of transit of the immense commerce of that district. He authenticated in every way the reports of the richness and wealth of the country, and expressed the most earnest desire that I would not allow my energies to flag in the endeavour to open out such magnificent rivers as the Ob and the Yenisei.

Pushing forward I reached Tumein, the principal city for shipping on the Ob. Here I found the spirit of progress in full operation. On the river were to be observed steamers of the largest dimensions, being nearly 300 feet in length and of 300-horse power, built and finished in a good style, with modern engines constructed principally by the English firm of Wardrapper Bros. I also observed splendid lighters of between 200 and 300 feet in length, and capable of carrying upwards of 500 to 600 tons of cargo, at the same time drawing not more than 3 feet of water. On the shore, at the different shipyards, many were to be seen in various stages of progress.

Proceeding night and day *viâ* the Ekaterinburg Pass of the Ural Mountains, ascending the eastern slopes on the last day of the old year, and descending the western side on the morning of the new year—thus leaving the Ural and the old year behind together—soon I found myself at Nishninovgorod, where I took train to St. Petersburg. At Moscow I was well received by the President, Count Camarovski, the Vice-President, Mr. Trapeznikoff, and the Secretary, Mr. Waldemar, of the Imperial Society for Marine Communications. These gentlemen also gave me much valuable information. This Society is now organising a steam expedition to sail from some European port next summer with the intention of exploring the Gulf of Ob as far as Obdorsk.

On my arrival in St. Petersburg the Imperial Societies of Commerce and of Marine Communications requested me to read papers upon the experiences of my voyage and the future prospects of commerce with Siberia. Having complied with these requests, I was presented by each Society with a life membership and a chart of the locality of my explorations, handsomely bound in morocco and gold, together with a letter of thanks from each society. After a fortnight's sojourn at St. Petersburg, I started for home, arriving in London on January 31st. Before I return to Siberia I hope to create sufficient interest amongst our men of science and commerce to despatch at least one steamer to the Yenisei this summer. As a proof of the openness of this sea, I need only mention that Professor Nordenskiold proceeded with the greatest of ease to the entrance of the Yenisei and landed a portion of his cargo at the entrance of the village of Korepovskoye, staying eighteen days there, and then returned direct to Stockholm. Mr. Gardiner, has, with his steam-yacht the 'Glow-worm,' proceeded without any impediment direct into the Kara Sea *viâ* the Matochkin Shaar, sailing northwards to the vicinity of Barents' wintering quarters of three centuries ago, recovering many of the most interesting relics connected with that expedition. From thence he sailed to the northernmost part of Novaya Zemlya, returning again down the east coast to the southern shores of the Kara Sea, crossing to the vicinity of Lütke Island, passing northward along the Yalmal coast, and to within a few miles of White Island. Having expended nearly all his coals, Mr. Gardiner then steered south, direct across the sea, passing out by Pett Straits.

I have obtained a very fine collection of botanical specimens from the vicinity of the Yenisei, as well as specimens of ermine and other furs, which are pronounced by competent judges to be of the finest by the natives, who stated that there was abundance quality. Mammoth tusks were also presented to me to be found in the deserts or tundras adjoining the districts of this river. These voyages, and our ascent of the Yenisei with the first European steamer and cargo that has ever reached so far into those regions in the annals of history, should surely be a convincing proof of the feasibility of this route for commerce. It may even yet prove to be the best route to the Pole, seeing that it is more than probable the warm waters of these mighty rivers will, after joining the salter waters of the Kara Sea, pass on to the north-eastward, round towards the open water as seen by Baron von Wrangel. Smith Sound route to the north-west having been investigated, it is to be hoped that our next Polar Expedition will turn its attention to this north-eastern route.

JOSEPH WIGGINS, F.R.G.S.

THE WORKS ON THE TIBER.

FROM the earliest periods of Roman history to the present day the question of how to protect Rome from the inundations of Father Tiber has occupied kings, consuls, dictators, emperors, pontiffs, as it now occupies the state, provincial and municipal councils of the capital of united Italy; and for more than twenty centuries he has defied one and all, and all with impartial audacity,

> "To teach his feet a measure,
> And find his mouth a rein."

Small blame, therefore, must be attached to the authorities who have ruled in Rome since 1870, if it has taken their best engineers six years to survey, choose one from the numerous projects submitted to them, and send in the probable estimates. It is to their credit, we think, that even now, in supporting the very modest project finally adopted, they say: "The works we propose are absolutely necessary and certainly harmless: they may suffice; if they do not, the experience gained during their execution will indicate the next step to be taken: we cannot conscientiously pledge ourselves to support any special project of rectifications or deviations until this first series be completed."

More than eighty inundations of the city of Rome are registered from its foundation to the present time, and despite all the efforts made to impede or diminish their force, there is fair presumptive evidence that this last flood of 1870 was the fourth on the list for magnitude and violence, being surpassed only by those of 1598, 1606, and 1637.

We say presumptive evidence, because only from 1378 has the height to which the waters rose, in certain portions of the city, been inscribed on tablets at the Minerva, and later at the Hydrometer of Ripetta. The first of these tablets was ordered by Urban VI., "8 November, 1378, 10 palms at the Minerva," but modern researches have failed to discover to what level of the river the ancient records refer.

As to the inundations previous to 1378, we have but vague indications of their magnitude, though it is certain that the havoc and desolation was great. The first flood mentioned by Livy "was witnessed by the consuls Gneo Genuzio and Emilio Mamerco, in 390 B.C."

In the year 2 B.C. (732 Roman era), the Ponte Sublicius was carried away; rebuilt by Nero 56 A.D., and was again destroyed in 69. In 119, under the Emperor Hadrian, it was feared that the entire city would be submerged. In 576 the waters covered the walls of the city, and in 717 the flood lasted seven days, covered the walls of the city, which was navigable from Ponte Molle to the church of St. Peter's, and in Via Lata the waters rose higher than two tall men!

All these vague records throw little light on the question of paramount importance, "What is the maximum height to which the waters have risen in the past?" to which question the answer must be found before it can be decided what are the defences necessary to provide against a recurrence of the catastrophe in the future. One of the chief "projectors" of the present day, the engineer, Sig. Canevari, whose plan substantially is accepted, opines that it suffices to provide against such a flood as that of 1870. His opponents point to the three previous ones, proved to have been greater, and to the great flood of 725 when in Via Lata the waters rose higher than two statures. But, replies Canevari, in order to avail ourselves of the few notions handed down to us touching the inundations, we must bear in mind the topographical conditions of ancient Rome. In the first place there were seven bridges, all with ogival arches; seven dams instead of four, as we have to-day, preventing the downflow of waters in time of floods. Again, the level of the city was generally much lower than at present. To take the case in point. During certain excavations in Piazza Sciarra, the pavements of houses were found 7½ metres below the actual level, and there was the *Via Lata*. The pavement of the church of St. Mark is 2 metres below the level of the Piazza di Venezia; another entire street, paved with octagonal blocks of basalt, exists at 9 metres below the present level! Livy says that the Tiber flooded Campio Marzio and the plains at the foot of the Capitoline and Palatine Hills. But it must be borne in mind that the valleys between these hills were mere swamps, their level much lower than at present, even as the sub-arch of the Cloaca Massima proves how depressed was the plain of the Velatro. In short, Sig. Canevari concludes that nothing in the records of ancient inundations indicates that they were more serious or higher than those that have occurred within the memory of present generations.

Be this as it may, the efforts made in successive ages prove the magnitude of the evil; also, that there is nothing new under the sun, and that hydraulics have made small progress as compared with other sciences.

The Etruscans seem to have been the first to excavate a channel to receive the surplus waters of the Tiber, whose source is Mount Coronaro near Mount Falterona, whence the Arno flows. Some writers attribute this new channel to the work of man, others to nature. Ancient geographers affirm that all the waters of the Upper Arno were originally discharged through the Val di Chiana into the Tiber by its tributary stream the Paglia, whose bed at the southern extremity of the Val di Chiana had about the same level as the Arno: but whether the depression of the bed of the Arno, and the raising of that of the valley by the deposits of the lateral torrents, finally cut off the branch which had flowed into the Tiber, or whether the channel was really cut, these supplies were deviated shortly after the building of the city of Rome. The Cloaca Massima was constructed by Tarquinius Priscus between the Velabrum and the Tiber to carry off the waters of the two branches of the former river which wound round the Palatine, the Aventine and the Capitoline hills; and this subterranean canal, while draining the marshes between the hills, and serving as a great common sewer for the city, considerably increased the volume of the Tiber's urban waters. A proof of the rise of the level in the bed of the Tiber consists in the fact that the channel, which had originally a considerable fall, has been choked up to more than two-fifths of its original height.

Julius Cæsar, 59 B.C., formed the gigantic project of deviating both the Tiber and its chief tributary the Arno, bringing each river down in a straight line to Terracina, thence to the sea; "warping" the Pontine Marshes *en route;* but by this line the course of

the river would have been doubled, the declivity so slight that the bed of the river would have been "filled up" before the marshes were reached.

In 27 B.C., Augustus Cæsar consulted 700 engineers, but the idea was rejected as impossible.

In the time of Tiberius the inundations were attributed to the tributaries, and the Emperor proposed their diversion; but such was the popular reverence for the waters, or probably so keen was the sense of their importance for the purpose of defence and navigation, that the Senate rejected the proposition.

In 41 A.D., Claudius, seeing that the port of Ostia was becoming unserviceable, "silted up" as it was by the sands of the sea and by the deposits of the Tiber itself, whose crooked course of 8 kilometers was even then scarcely navigable, cut a new branch, starting from the spot which is hence called *Capo due Rami*, and constructed a new port to which Trajan added magnificent warehouses. But this port shared the fate of its predecessor, and is now more than 3 kilometers from the sea.

Nero ordered Severatus and Cellino, "great and daring engineers," to construct a canal from Avernus to Ostia, seeing that the floods ruined edifices, undermined "bridges deemed sacred" (alluding probably to the Sublicius, which had been rebuilt in stone and yet destroyed); did not spare citizens, having sacrificed 700 who dwelt in places believed safe. But Nero had consumed, for his follies and vices, the funds of the veterans, and the people murmured, and the project was abandoned. Aurelian built walls along the Tiber. The Pontiffs Nicholas III., Martin V., Sixtus IV., Alexander VI., Leo X., Clement VII., Paul IV., Pius V., Sixtus V., Alexander VIII., Clement VIII., and Innocent X., all made strenuous efforts to diminish the inundations. Some proposed to deviate the Arno and bring it down by Marino, Tivoli, and Velletri to the sea; others to make a grand reservoir on the left bank of the Velino; others to send the Velino to the sea; others again to turn the Tiber into the valley to the Arno, lead it down by the Marienella back into its bed below the city, and to embank its shores. And the embankment constructed across the portion of the Val di Chiana lying within the Roman territory so promoted the deposit of sediment and the elevation of the bed of the valley, that the effect of this measure and of the continued spontaneous action of the torrents was, that the northern slope, which, in 1551, had commenced at the distance of 10 miles from the Arno, was found, in 1605, to begin nearly 30 miles south of that river, and, in 1645, it had been removed six miles further in the same direction.* The Tuscan and Roman governments fought fiercely for the safety of their respective rivers, and the conflicting interests prevented the general drainage of the Val di Chiana until the latter half of the eighteenth century.

In 1678 a very quaint and talented Dutch Engineer Cornelius Meyer, having been ordered by Clement X. to make a report on the Tiber throughout its length and breadth, went to Perugia and came down to Rome by water, "noting on paper all that seemed worthy of record," and because, as he puts it, "other people should not, as too often happens, steal his ideas and inventions and discoveries," he thought it well to print everything in a book, and a very wonderful book is this, on *L' Arte di restituire a Roma la tralasciata nauigatione del suo Teuere.* It is divided into three parts—1. On the impediments to navigation which exist in the bed of the Tiber between Perugia and Rome. 2. On the impediments to navigation between Rome and the sea. 3. Why Rome was built and maintained on the banks of the Tiber, and other propositions useful to the Ecclesiastical State. The folio volume, with maps and diagrams, is dedicated *Alla Santita di nostro Signore Papa Innocentio XI.*

In those days, before the invention of railroads, the Tiber as a navigable river was of paramount importance to Rome, and Cornelius Meyer maintained that the water traffic with Perugia might be restored easily, so that by the shortest and safest way all the products of Perugia, Umbria and the countries on their borders might be brought down for the abundant maintenance of the inhabitants. Thus we should no longer be dependent on the good-will or convenience of *foreigners* for oil from the Riviera of Genoa, wines from Sicily and Corsica and other parts, whose cargoes are often seized by pirates, or lost in tempests, and the price of merchandise thus raised. The money of Rome would remain in the provinces, and increase the wealth of the Ecclesiastical States.

In the chapter "Why Rome was built on the Tiber," the author launches out against those presumptuous engineers who propose to deviate the river from the city, treats Roman engineers with scant respect, and gives descriptions and diagrams of hydraulic works, and of machines used in Holland, of which he says they are totally ignorant. "Unfortunately," he observes, "the finances of Rome are not in a flourishing condition," and hence, in his propositions for preventing inundations, he is compelled to keep this fact constantly in view. So he merely proposes the removal of all obstructions in the river's bed, has no scruples in suggesting the destruction of the old bridges, insists that the river must run level and the banks be of equal width from Ponte Molle downwards.

Intent on restoring to Rome her lost navigation, Meyer goes deeply into the question of keeping the river clear, giving it sufficient depth and width between Rome and the sea; shows by what constant efforts the Pisares have succeeded in maintaining the water traffic of the Arno clear to the sea; shows how the Port of Ancona had become useless, and how all sea-ports can be defended from noxious winds and kept dredged by the currents of the rivers. He attributes the inundations in great part to the insufficient scouring force of the lower branches of the river, and warns the Government that Fiumicino, "where even now in summer ships cannot enter, and are often driven on the bar and wrecked, will soon be altogether unserviceable as a seaport." To avert this danger he considers it indispensable to rectify the curves of the river below the Basilica of St. Paul's, as the bends and meandering courses of rivers, beneficial in their upper reaches, are detrimental near their mouths because they diminish the rapidity of the current, consequently its scouring force, which between Rome and the sea is already too insufficient, owing to the slight declivity of the bed and the division of the river into two branches at CAPO DUE RAMI. The river straightened between Rome and the sea should, he thinks, be led down to a new mouth, after (by

* G. P. Marsh.

colmare) leaving its deposits in the Maccarese swamps. He thus indicates the warping system so successfully adopted to fill up the Lincolnshire fens.

Reading this important work during the Tiber fever of 1875, we could but smile at the quarrels of the engineers gathered in Rome, each eagerly vindicating for himself the paternity of this and that project, whereas not a single proposition was made that had not been brought forward and discussed centuries ago.

In 1744, three-quarters of a century after Cornelius Meyer consigned his projects to the press, we find two celebrated engineers, Chiesa and Gamberini, engaged on researches as to the causes of, and the possible remedies for, the inundations of the Tiber. They reject, both of them, the idea of bank walls, as dangerous owing to the extreme height to which they must be raised in order to contain the waters during a flood. Neither do they believe that main drains either side the city could be efficaciously brought back into the river at a few miles below the walls, yet both these works form part of the plan accepted by the present Government.

At the commencement of the present century, during the French domination, a regular organisation of the urban Tiber was proposed and even set in operation under the direction of the celebrated Navier. It consisted in shore-walls on either side the river to serve as promenade and for building purposes, but no provision was made for the main drains or the exclusion of the sewerage from the river, or for embankments on the north of the city. During the present century there have been three great floods—that of 1805, when the waters rose 16·42 at the Hydrometer at Ripetta; that of 1846, but 23 centimetres lower; and that of 1870, when they rose to 17·25, on the 28th December, just three months and a week after the Italians had taken possession of Rome.

In the following January the ministry named a commission of hydraulic engineers to survey the Tiber and its principal affluents, to study the temporary and permanent causes of its inundations, and to propose the remedies against such catastrophes in the future. Projects poured in on all sides: for mountain dykes, for the deviation of the Tiber, the deviation of the Arno and its tributaries, for main drains round the city, for urban and suburban rectifications, for excavation of the bed and removal of obstructions, for shore-walls, and for embankments to the north of the city.

At the end of the year the commissioners excluded, by eight noes against two ayes, all suburban projects, limiting their propositions to the removal of all obstructions from the river, to securing a sufficient and equal width of water-way by the destruction of bridges and ruins now impeding its course, and to embankments and shore-walls where the banks are low or weak.

These propositions were consigned to the municipality, and between the transfer of the capital and the expenses thereby entailed, political occupations, and the comforting chance that one heavy flood is rarely followed by a second for ten and even twenty years, the projects were allowed to slumber until Garibaldi, in 1875, came from Caprera to Rome and woke up the slumberers, giving the Government and municipality no peace until they carried a law through parliament for the immediate commencement of works on the Tiber.

The law passed on the 6th of July, 1875, merely provided that the sum of money to be expended on the Tiber should not exceed sixty million lire; half of this to be paid by the State when a special fund could be appropriated; of the remaining half the Commune was to pay three-fourths, the province of Rome the other fourth; the Government to decide on the nature of the works, guided by the Superior Council of Public Works.

Here, as of old, the difficulties commenced; "projectors" flocked to Rome and inundated the Government with conflicting proposals. Garibaldi, supported by a fair array of engineers, drew up a plan of his own, concise and comprehensive, which he embodied in a letter to his chief ally, the erratic Filopanti, held in great repute for his hydraulic science and for his hydraulic skill in stemming the inundations of the Po. "I consider it necessary," runs the letter, "to deviate the Tiber above its chief tributary, the Arno, to bring it down through the valley of this river as far as Monte Sacro, leaving this hill on the left to follow the plain of the Marranella, and after cutting through the hills below Porta Turba, to descend by the valley of the Almone and restore the Tiber to its old bed below St. Paul's. In Rome there must be a canal with 100 metres of water-way between the banks, with floodgates through which a given quantity of water can be brought in from the suburban Tiber. This canal, after receiving all the drains of the city, to issue thence by Porta Portere, and, instead of uniting with the Tiber, to run down parallel to the sea, leaving its deposits in the immense Maccarese swamps which it would *colmare* (warp) and fertilise.

"I approve the project for the port, submitted by Wilkinson, to be constructed at Fiumicino, and the railroad from Rome to Fiumicino, projected by Semenya. Meanwhile the plans for redeeming the Agro Romano must be matured.

"The urban canal would not occupy entirely the old bed of the Tiber, but the curves of the river would be rectified and its banks transformed into a public promenade. In my opinion, and that of my technical friends, the deviation of the Tiber, the urban canal and the port would not cost more than eighty million lire."

In these few lines the old General had summed up all the various and colossal plans of the Cæsars and the Popes with the same precision and simplicity as is his wont when penning his battle-orders for the morrow.

The opposition raised against this *multum in parvo* project was intense. Romans, gentle and simple, consider with Cornelius Meyer that the idea of expelling the Father Tiber from the Eternal City is presumptuous and preposterous. The fact that all nations have striven to erect their great cities on the banks of great rivers, Thebes and Memphis on the Nile, Babylon on the Euphrates, Nineveh on the Tigris, Paris on the Seine, London on the Thames, Petersburg on the Neva, Vienna on the Danube; and in Italy, Florence on the Arno, Verona on the Adige, Turin and countless other northern cities on the Po, justifies their feeling. And Filopanti, aware of this popular prejudice, took care in his public lectures to replace the ignominous word "canal" by the nobler denomination of urban and suburban Tiber. Other opponents proclaimed the scheme impracticable;

affirmed that in times of flood no flood-gates would suffice to prevent the mass of waters from re-occupying their old bed, while in times of drought one of the two streams would fail, and fever and every form of disease result. Then came the paramount question of expense. Not only Roman and Italian, but foreign engineers of vast repute scoffed at the sixty million lire, averring that they would not suffice for the simple excavation of the new bed; that until borings had been made and the quality of the soil, especially of the hills below Porta Furba, ascertained, no estimates were possible; and in this assertion Mr. Fowler, sent by the Duke of Sutherland to assist Garibaldi with his experience and advice, fully concurred.

The Minghetti Government, most anxious to conciliate Garibaldi, and keep him engrossed with the Tiber instead of politics, while consulting, as in duty bound, the Superior Council of Public Works, strove to keep the final decision in their own hands; but the members of the Council, after listening attentively to all that the Minister of the Interior could urge on political grounds, and after coming to a clear understanding with the Minister of Finance, politely suggested that the rest was a technical question and must be left with themselves exclusively, and named a fresh commission to examine and report on nineteen different projects. The members of the commission resolved the projects into four distinct systems, and, rejecting three, among which figured Garibaldi's, decided that all the works necessary within the city for systematising the Tiber should be executed, and that this "first series of works" completed, a fresh survey should be made if they proved insufficient, and fresh projects studied and reported on.

The considerations which precede the exposition of the project adopted, and give the reasons for the rejection of the others, appeal strongly to common sense, even though competent authorities contest their value.

The engineer Canevari, who has been mainly responsible for the decision, affirms that the causes of the inundations of the Tiber are yet to be discovered; that the meteorological observations made previously to 1870 were all insufficient; that it can only be affirmed with certainty that a given quantity of rain must fall for four or five days in the watershed of the Tiber and its tributaries before the river overflow its banks, but that how much of this is absorbed by the soil, how much evaporated, and how much flows into the Tiber, is not yet ascertained. For a long series of years it was deemed necessary for a certain quantity of rain to fall in the valley of the nearer tributaries in order to produce a flood, and especially in that of the Arno; but in 1870, between the 23rd and 27th December, the Arno flowed in neither higher nor lower than usual, and the flood of the 28th was attributed to the quantity of rain that fell in Perugia, to the mass of water that flowed into the upper reaches of the Tiber and to the various drains of the valley of Umbria. The numerous meteorological stations now opened along the Tiber will materially assist future researches as to the causes of floods. Again, little or nothing is known of the intricate net of drains which, constructed at different periods, permeate the subsoil of the Tiber's basin. Certain it is that when the waters in the river do not rise higher than 14 metres at the Hydrometer of Ripetta (the level of the bed here in ordinary mean water being 5·20 above the sea-level), the first sign of flood is given by the waters gurgling back through the sewers and emptying themselves by the mouths of these into the squares and streets; and moreover the flood is limited to the lower portions of the city, so divided from one another by higher ground that the waters do not find a common level, but stand for instance far higher in Via Ripetta than in the Pantheon Square, where they arrive by the great drain which empties itself into the river near the Island of the Tiber, while the waters in the Ghetto are yet lower. These "floods of expansion," as Signor Canevari calls them, frequently occur, and do not inspire such terror among the inhabitants of Rome as does the first cry of "the Po rises" among the riverside populations of the north. It is only when the hydrometer indicates a rise above 15 metres that the river really becomes dangerous, and invading the surrounding country transforms its valley into its proper bed. In 1870 the waters pouring down from the upper reaches above the mouth of the Arno found serious resistance from the Monti Parioli, and the immense mass of water, again dammed back by Ponte Milvio, crossed Via Flaminia, destroying the walls in parts, in others using them as a canal whereby to enter the city at Porta del Popolo. This current entered the urban bed of the city near the Hospital of St. Spirito, destroying the parapets of the fosse of the Castle St. Angelo and of the Piazza Pia. For some time the waters kept their various levels as in the "floods of expansion;" but once risen to the top of the intervening heights the inundation became general, the waters within the city corresponding to those above, exceeding by several metres those below the city. It is on the data gathered of the various levels of the bed of the river during this flood that the members of the Superior Council of Public Works formed their propositions for future defence. These levels vary from 1 to 4 metres, in proportion to the different widths of water-way, and to the obstacles offered by bridges and protruding edifices along the banks. In ordinary mean water the width of the river from bank to bank above and below the city varies from 90 to 100 metres, but at the edifice *dei Lotti* this width is reduced to 55 metres, and the banks are almost vertical. The 64 metres at Porta di Ripetta are enlarged to 90 metres between the ruins of Ponte Trionfale and the commencement of the Gardens of the Farnesina, and again restricted to 58 metres between the lower portion of these gardens and the vertical walls of the Falconieri Palace; again the river enlarges gradually to 90 and 100 metres at the "Marmorata" and again is narrowed to 80 at the quays of Ripa Grande. The mean discharge of the Tiber at its entrance to the city is put at 280 cubic metres a second; in ordinary floods when the hydrometer indicates the surface of the water at 13·75 metres, it is 1300 metres per second. In the flood of 1870, when the hydrometer indicated the height of the water at 17·22 metres at Ripetta, and higher up at Porta del Popolo at 17·42 metres, Professor Possenti, the president of the commission nominated in 1871, gave the volume of water passing down the Tiber at 2800 metres a second. Filopanti estimates it not less than 4000 cubic metres, observing that those who make the lower estimate do not take into account the temporary excavation of its bed, as the traces are lost by the deposits dropped

during the subsiding of the waters, nor the enormous quantities that overflow into the adjacent country. Be that as it may, the width of water-way was insufficient on the one hand, while the discharge was prevented by obstruction at the various bridges at the Farnesina Palace, and especially by the Bridge of St. Angelo, which acted as a dam, the water standing above the soffits of the arches 1·5 metre. Ponte Sisto, where the waters rose above the soffits of the lower arches, and attained the keystone of the higher ones, also helped to dam back the waters; hence the flood.

Ergo, say the commissioners, it is clear that the first steps to be taken are those that may insure a sufficient width of water-way between the *Mattonaja* on the north, to the Marmorata at the south of the city. And in order to effect this, there must be no obstacle above a straight line drawn from the bed of the river; all obstructions must be removed from its bed; the bridges that serve as dams removed or altered, and a uniform breadth of 100 metres between the banks obtained.

And in the "first series of works proposed," the commissioners confine themselves strictly to the means for promoting this immediate end. The bed of the Tiber is to be widened at the Farnesina, with river-walls 1700 metres in height above the zero of the hydrometer and 1·20 metre of parapet; the width of the river between the inner shores of the walls uniformly 100 metres, the same width and height of walls to be given at the Rigola. Instead of closing one of the branches of the river that runs either side the Island of the Tiber, as was first proposed, and widening the other to 100 metres, both are to be retained; the left branch to be 70 metres, the right 60 metres wide, with shore-walls and iron suspension bridge in the place of the old Pons Cestius which now connects the island with the Trastevere. The right shores above Ponte Elio and the bastion of St. Angelo to be cut away till the uniform width is obtained; so with the shore on the right in front of Ripetta. The remains of the old Ponte Rotto, whose two arches on the left of the river were carried away by the flood of 1598, and whose remains, consisting of three arches with two smaller ones, through which the water only runs in time of flood, and now serve as the west pier of the suspension bridge, to be entirely destroyed to its foundations, and an iron suspension bridge thrown right across the river. The remains of the Pons Sublicius, the oldest and most revered of Roman bridges, of which the only traces are its foundations, seen only at low water, are to be excavated, and all the ruins, piles, and incumbrances cleared out between Ponte Sisto and Porta Portere. The bed of the urban Tiber is to be thoroughly ploughed and purged of the extraneous matter there accumulated, especially under the arches of Ponte Sisto, where they form a regular pavement or plateau. The remains of the piles of Pons Triumphalis, that longest of bridges, built by Nero, leading from Campus Martius to the Via Triumphalis over Monte Mario—of whose piers some portions are visible at low water between Ponte St. Angelo and the suspension bridge near San Giovanni dei Fiorentini—are to be removed. It is estimated that this first series of works will cost ten millions, and occupy three years. Should a surplus remain, it is to be devoted to the construction of a main drain on the left of the Tiber to collect the city sewerage, and carry it down into the river below St. Paul's. When these humble efforts have been made, say the commissioners, and we see what discharge can be thus attained, we shall be able to judge better of the future necessities. It will be seen whether it be necessary to throw up strong embankments on either side above the city, to level its bed above and about Ponte Molle; whether the river walls are advisable the entire length of the Tiber's urban course; whether it be necessary to amplify the Bridge of St. Angelo, to build embankments below the city to protect the Basilica of St. Paul's, and then may be solved the much-vexed question of the rectification of the bends to the south of the city, while the new hydrometers to be opened at the Milvian Bridge, St. Angelo, San Giovanni dei Fiorentini, Sisto, Quattro Capi, and Rotto, at the Civita Vecchia Railway Bridge, above and below the mouth of the Arno, will enlighten us as to the declivity of the river in the various stages of its course at present, and serve to compare it with the declivity obtained after the proposed systematization.

When we confront these modest proposals with the gigantic schemes of the Cæsars and of Garibaldi, we cannot help exclaiming,

"Oh, what a fall is here!"

hoping that the commissioners may obtain a relative fall in the waters during flood-time. A strong argument in their favour is the fact that their staunchest opponents admit that this series of works is at any rate indispensable, even were the suburban and urban channels decided on; that the waters having to struggle with fewer impediments will flow with greater rapidity, and that the level of the surface in ordinary mean water, as in flood, will be lowered, though not to the extent imagined by the sanguine projectors. Hence, as the lesser does not exclude the greater, nor a part the whole, the champions of the deviation scheme, believing that its realisation can alone guarantee Rome against the perils of inundation, smile complacently at these small beginnings, and repeat,

QUOD DIFFERTUR NON AUFERTUR.

TOPOGRAPHICAL SURVEYS IN ASIATIC RUSSIA DURING 1875.

BY M. VENYUKOF.*

IT has been customary for many years to exhibit to the Emperor the results of the Topographical Surveys made throughout the Russian Empire in the course of the past year. This exhibition possesses great interest, for it shows at a glance what progress has been made in the different portions of the Empire. This year's exhibition was particularly interesting, more especially on account of the many new maps referring to Asia. There were no less than 104 separate works on Asia in the catalogue, several of them consisting of numerous sheets, and they occupied a considerable space in the Winter Palace. There were printed maps, manuscript surveys, sketches made in the field, photographic copies of plans, memoirs to accompany them, and a few books, partly still in manuscript.

* *Izv. Russian Geographical Society*, 1876. Part 2.

1. A Topographical Survey of the Gulf of Tartary and the Japan Sea, from Castries to Plastun Bay, executed in 1874, by a Topographical Detachment under the superintendence of M. Bolshof, attracted general attention. The survey was made on a scale of 1 verst to the inch, and is laid down upon 47 sheets, the contents of each being shown on an index map. This work fills up a large gap in the geography of the Maritime District of Eastern Siberia. It is more especially interesting, as we learn from it that there exist in the small valleys debouching upon the Japan Sea numerous settlements of Chinese and Orochi, who fish not only, but also carry on agriculture on an extensive scale. We learn from this map that the summits of the Sikhota Alin attain a height of 5000 feet. These mountains are covered with woods, consisting of conifers in the north and of foliferous trees to the south of lat. 47° N. Our surveyors failed to identify the Suffren Bay mentioned by La Pérouse, but they identified Ternei Bay. Careful astronomical observations enable us to place this survey accurately upon our maps.

2. A map of the route along the Rivers Shilka, Amur, Usuri and Sungari, and thence to Vladivostok, constitutes an important addition to our knowledge of Siberia. It is drawn on a scale of 5 versts to the inch, and shows the position of all the Russian villages along the Amur, many of which have been removed further inland, on account of the periodical inundations of the river. It shows, for the first time, the position of Blagovesenye, a Korean village below the Khingan mountains, which is the most flourishing agricultural settlement on the Amur, and boasts of 120 homesteads, a temple, a school, &c. Detailed plans of the principal towns, such as Blagoveshchensk, Khabarovka, Vladivostok, Nikolayevsk, &c., are furnished. Vladivostok, as originally projected, extends for several versts along the bay known as the Golden Horn. This extent, however, is partly accounted for by a range of cliffs, upon which buildings have been erected. A dry dock is being constructed at Vladivostok; but the road into the interior, along the Seifun, is practicable only for led horses, although the town is at present the capital of the Maritime District. The non-existence of a carriage-road is accounted for by the mountainous and swampy nature of the country, but this circumstance only proves to us that Vladivostok is not a suitable capital for the two districts of Amur and Usuri. Khabarovka occupies a far more central position, and there can hardly be a doubt that it will become the capital at no distant period.

3. Amongst the labours of the Topographical Section of Eastern Siberia there is a triangulation of the district of Nerchinsk, which is to be extended. Our maps of Eastern Siberia have been compiled hitherto from mere route surveys and topographical sketches based upon a few points determined astronomically. Most of them are full of gross errors. On Budogorski's map of the Amur, for instance, Ust Strelka is half a degree too far to the south, and the course of the Chikoi is quite distorted. These triangulations will enable us to rectify our maps.

4. We possess a general map of Western Siberia on a scale of 10 versts to the mile, but it is based upon very inadequate materials. Miroshnichenko continues his astronomical observations, whilst the surveyors have completed a 2-verst map of that portion of the district of Semipalatinsk which lies beyond the Irtysh.

5. Orenburg supplies a few objects of great interest. The route map connecting Lake Sam with the salt swamp Barsa-Kilmes, to the west of Aibugir, is particularly interesting. It is combined with a line of levels which joins the Aralo-Caspian line of 1874. Two fine maps of the country of the Orenburg Cossacks (scale 5 versts to the inch), and of the Bukeyef Horde (10 versts to the inch), likewise deserve to be mentioned, for they considerably enlarge our knowledge of these districts. There are likewise a survey of the district of Nikolayef in the province Turgai (1 verst to the inch), and plans of the salt-works in Iletzk and of the coal mines near the Rivers Ut and Suryanyam.

6. The Topographical Section of the Caucasus, under the direction of Colonel Stebnitzki, has exhibited a series of important works on Asia. We are furnished with a map of the Trans-Caspian territory, on a scale of 20 versts to the inch, based upon astronomical and topographical survey. There is likewise a map of that portion of the Usboi which lies between the River Balaishen and Sary Kamysh, from a survey made in 1875. The map of Trans-Baikal shows that much remains to be done before our knowledge of these countries can be called complete. It is joined on the south by a map of Persia, drawn on the same scale (20 versts to the inch), and consisting of 12 sheets. This map is accompanied by a learned memoir by Stebnitzki, filling a stout volume. A map of a broad belt of country, and extending from the Bay of Enzeli to Teheran (2 versts to a mile), is likewise an important addition to our knowledge of Persia. The 12-sheet map is at present being engraved, and was represented at St. Petersburg in photographed copies merely.

A small hypsometrical map of the Caucasus (40 versts to the inch) attracted much notice. It is to be consulted when shading the hills on larger maps. The necessity of such a standard of comparison is demonstrated by Colonel Artamonof's map of Turkey in Europe, upon which the Carpathians are tinted far too lightly in comparison with the Balkans, and to a certain extent the same remark applies to Stebnitzki's large map of Asia Minor. Amongst other maps of this section we mention that of Ajaria and a portion of the vilayet of Trebizond (5 versts to the inch).

7. The work of the Turkistan Topographical Section joins that of Orenburg in the south. Ferghâna, the theatre of so many warlike events during 1875, engaged the principal share of its attention. Ten routes surveyed and combined into a map of the district of Namangan, or rather of the valley of Ferghâna, for it extends to the foot of the southern hills.

A survey of the desert Moyun-Kum, to the south of the Chu, has been completed, and much additional information will be found on the maps of the environs of Samarkand, Jizak, Khojent and other places. Samarkand and Katty-Kurgan have been connected by a triangulation, which affords a trustworthy base for detail surveys. The sketch of the Hissar Expedition has already been published.

A photographic copy of the map of Asiatic Russia, which attracted so much attention during the Geographical Congress at Paris, has been prepared by the Topographical Department of the General Staff. The publication of this map will no doubt prove as successful as did that of the 4-sheet map of Central

Asia, which is drawn on the same scale, and is being kept up to date. Revised copies of the maps of Orenburg and Western Siberia have been printed, and four sheets of the map of Turkey in Asia have been engraved at St. Petersburg. The map of Khiva and of the Lower Oxus has been produced by *heliogravure*, and a copy of it, by Major Wood, has been published in the *Journal of the Royal Geographical Society*.

The large room in which these maps were exhibited likewise contained a few works on the military statistics of Central Asia. Many of these are by the author of this paper, such as the second part of a "Military Description of the Russian Frontiers in Asia," a "Sketch of India," papers on the Kurds and the military forces of Japan and China, with a map showing their distribution, a "Report on the Armies of Russia in Asia, China, Japan, India, Eastern Turkistan, and Turkey in Asia." There was likewise a memoir on the military forces of the Ottoman Empire, prepared by the Oriental Scientific Committee, and accompanied by a map showing their distribution in the beginning of 1876. We learn from this publication that the military forces of Asia, exclusive of Burmah, Annam, Afghanistan, Beluchistan, and the Dutch, French and Spanish Colonies, consist of 1,384,000 men.

There was also exhibited the Chinese collection made by Sosnovski and Pyasezki, consisting of products of Chinese industry, photographs, sketches, &c. It included a map of Matusovski's route from Hankau to the Zaisan post.

CHAMPA.

[The following article on Champa was written for the *Encyclopædia Britannica*, 9th edition, the subject being one of those which the writer had some years since agreed with the original editor, Professor Baynes, to prepare. The article has been omitted from the *Encyclopædia* for reasons which the writer does not clearly understand, but as it seems to himself worth printing, and as he knows it to contain matter which it took some time and trouble to collect, he has forwarded it to the editor of the *Geographical Magazine* for dispcsal. H. Y.]

CHAMPA is a name which has been for a very long time applied to a portion of that region to which we give the name of Cochin-China, though the extent covered by the name has varied. It is from the Malays that western navigators adapted most of the geographical nomenclature of the Eastern Seas. And Crawfurd implies that the Malays gave the name of Champa to the whole of the most salient part of the Cambojan Peninsula, including a part of the coast of the Gulf of Siam, as well as part of the China Sea.* It is possible that this usually accurate writer has here made a slip. But in any case the most ancient use of the name would seem to extend it to the Gulf of Siam. For there is strong reason to believe that both the Zaba of Ptolemy, and the Çanf or Tsanf of the early Arab mariners, both of which are demonstrably to be placed westward of Cape Camboja, are only representative of the same name, Champa. It is a persistent tradition in modern Camboja that the Cham or Tsiam race, the proper people of Champa, did occupy the Cambojan soil before the arrival of the Khmers, who have held it, probably, at least since the fourth or fifth century of the Christian era; and M. Garnier, who gave great attention to these questions, has deduced from such data as exist, in the Chinese annals and elsewhere, that the ancient kingdom which the Chinese describe, under the name of Funan, as extending over all the peninsula east of the Gulf of Siam, was a kingdom of the Cham race.

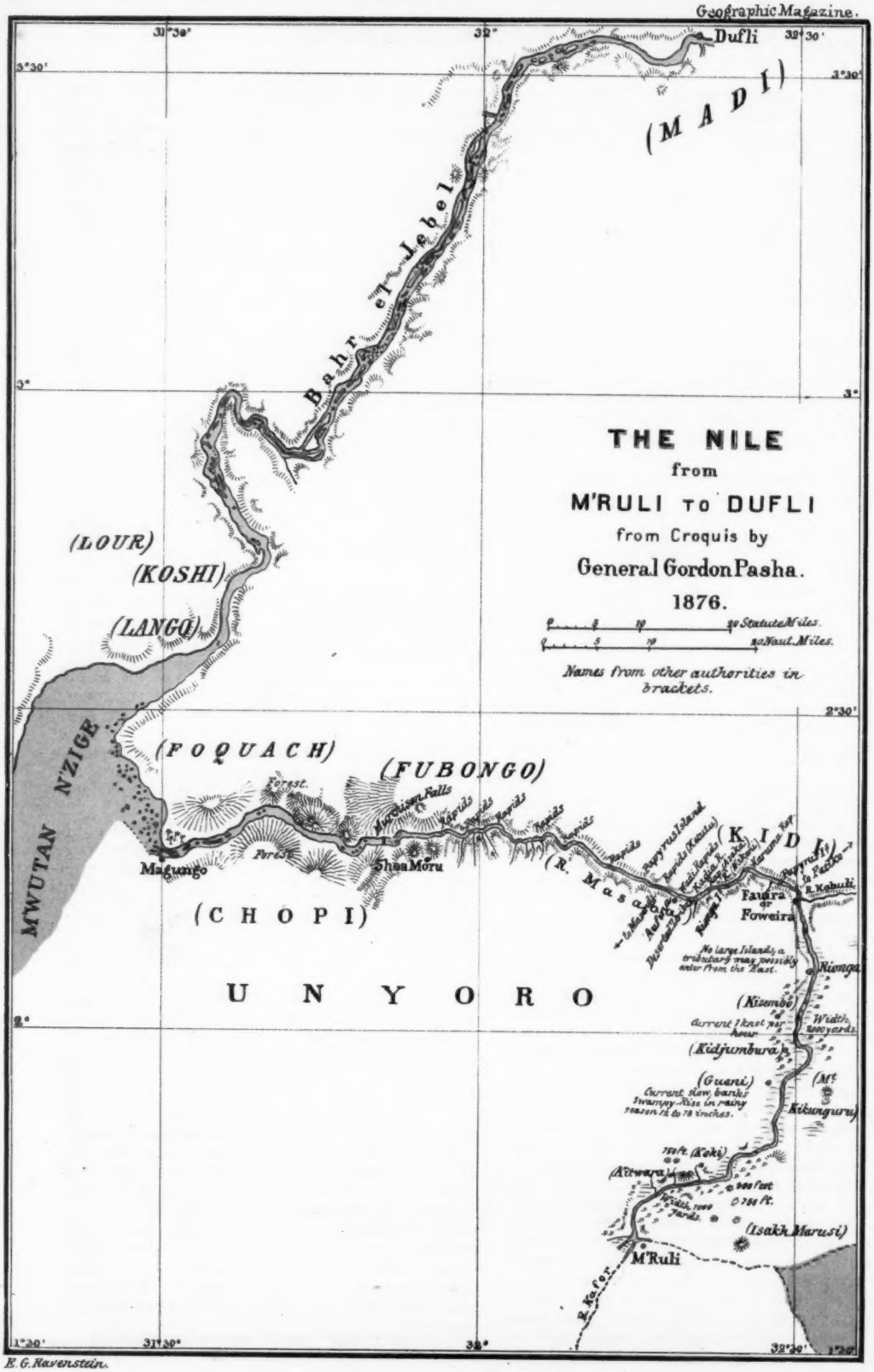
But in the medieval narratives of western authors (*e.g.*, Marco Polo, Friar Odoric, John Marignolli, Rashiduddin) the name Champa applies to that region which is now sometimes called Cochin-China Proper, as distinguished from Tongking, viz., the protuberant S.E. coast of the peninsula in question, extending northward to 16° or 17° of latitude, the position of which on the route to China caused its shores to be well-known to those voyaging to that country. This, or nearly this, was the kingdom called in the oldest Chinese annals Lin-i, and afterwards, till its extinction, Chenching. We hear of Chenching or Champa as being often at war with its neighbours, Tongking on the one side, and Chinla or Camboja on the other, and as for a time, at the end of the twelfth century, completely conquered by the latter. But it had recovered independence a century later, for Kublai Khan (1280-1290) had dealings in war and diplomacy with its king. According to Javanese annals, about the middle of the fifteenth century the queen of the principal sovereign of Java was a princess of Champa.

The precise historical relation of this ancient kingdom to the modern kingdom, which we call Cochin-China, is a little difficult to disentangle. But this southern kingdom of Chenching or Champa was conquered in 1471 by the King of Tongking or Anam, and has never since revived. For though there was for a long time, subsequent to the date named, and down to 1802, a separation of Tongking and Southern Cochin-China into two distinct kingdoms, the latter was not a revival of Champa, both being ruled by dynasties of Anamite origin. And after the conquest the name of Champa seems to have become restricted to the districts adjoining the south-eastern curve of the coast, and eventually to that district immediately eastward of the Cambojan delta, a somewhat barren tract with fine natural harbours, now called by the Cochin-Chinese *Binh-Thuân*.

This continued to be occupied by the people called Chams or Tsiams, whose dominion we thus presume (as far as we can see light in these obscure histories) to have first extended over the whole peninsula (as *Funan*); then to have been limited to its eastern and south-eastern shores (*Chenching*); and lastly to have been restricted to a small tract of those shores (modern *Champa* or *Binh-Thuân*).

Here a principality of Champa long continued to subsist, the residence of the prince being at a place called Phanri, about 10 miles from the sea, and apparently near, if not identical with, the present Binh-Thuân. The Champas, his subjects, were, in the sixteenth and seventeenth centuries, well known over the Archipelago as rovers and sea-faring people. This principality was often overrun by the Cochin-

* *Descriptive Dictionary*, "Indian Archipelago," *sub voce* Champa.


THE NILE
from
M'RULI TO DUFLI
from Croquis by
General Gordon Pasha.
1876.
Statute Miles.
Naut. Miles.
Names from other authorities in brackets.
Dufli
(MADI)
Bahr el Jebel
(LOUR)
(KOSHI)
(LANGO)
M'WUTAN N'ZIGE
(FOQUACH)
(FUBONGO)
(CHOPI)
UNYORO
Magungo
Forest.
Shua Moru
Faura or Foweira
(KIDI)
Rionga
(Kisembé)
(Kidjumbura)
(Gueni)
Kikunguru
(Isakh Marusi)
M'Ruli
R. Kafour
E. G. Ravenstein.

Chinese, but maintained itself in some shape of recalcitrant subjection to the latter till about 1820, when the Anamite King conquered it effectually, expelling the Champa prince and most of the people of the same race.

Name.—The name Champa is Indian, like the adjoining CAMBOJA (q. v.) and countless other names in Indo-China; and was probably borrowed from that of an ancient Hindu state and city which stood upon the Ganges, near modern Bhâgalpûr. Hwen-Thsang, the famous Chinese ecclesiastical traveller of the seventh century, makes mention both of the original Gangetic State (which he visited), and of the Indo-Chinese kingdom (which he knew only by hearsay), calling the latter *Mahâ-* (or "Great") Champa;* an indication, perhaps, of its ample dominion, either then subsisting or traditional, an amplitude of dominion which nearly all states of Indo-China have enjoyed in turn. Hindu titles are also distinctly traceable in the corruptions of the old Chinese notices of the names of kings, and even in one mentioned by Marco Polo.

Ethnology and Religion.—The people are known in Camboja as *Tsiams*, to the Anamites as *Loï*, *Thuân*, and *Thieng*. We do not know whether the former name has been taken from Champa, or the adoption of the Indian name Champa been suggested by the name of the people. They have been in great part driven into the mountains, or into the Cambojan and Siamese territory, where a number of them are settled near the Great Lake. There were also old settlements of them on the Cambojan coast, between latitude 11° and 12°. The people are said to exhibit, even in language, strong Malay affinities, and they have long professed Muhammadanism. *The books of their former religion*, they say, *came from Ceylon*, but they were converted to Islam by no less a person than 'Ali himself. The statement in italics is interesting. For the Tongking people received their Buddhism, such as it is, from China; and this tradition marks Champa as the extreme flood-mark of that great tide of Buddhist missions and revival which went forth from Ceylon to the Indo-Chinese regions in an early century of our era, and which is generally connected with the name of Buddaghosha.

Antiquities.—There have been many reports of the existence of monuments of Indian or Buddhist character in the Champa country; and Mr. Crawfurd saw an image of the Hindu god Ganesa, which was brought from that country to Singapore by a M. Diard in 1821. But there is, we believe, nothing yet precisely known as to the monuments, and indeed the late M. Garnier doubted their existence. There are also said to be many Mussulman structures, such as minarets and tombs, with Arabic inscriptions.

The district of Champa or Binh-Thuân, is one of those especially productive of eagle-wood or aloes-wood, and the *Tsanfi*, or aloes-wood of Champa, was one of the kinds in high repute with the old Arabs. The native name is *Kinam*. Ebony is also abundant.

Medieval Notices.—Both these products are mentioned by Marco Polo, who visited Champa as a commissioner from Kublai Khan about 1285. It was also visited forty years later by the Franciscan Odoric of Pordenone. Both travellers notice as prominent facts the immense family of the king, and the great number of domestic elephants that were kept. Both circumstances are still characteristic of most of the Indo-Chinese States. (Garnier, *Voyage d'Exploration;* Crawfurd, *Mission to Siam*, &c., and other works; *Bastian, Reise*, i. and iv.; *Mouhot's Travels; de Mailla, H. Gen. de la Chine*, tom. xii.; *Bishop Louis in J. As. Soc. Bengal*, vol. vii. and viii.; *Tableau de la Cochin-Chine*, &c., &c.) H. Y.

* Julien, *Pèlerins Bouddhistes*, iii., 83.

THE NILE FROM MRULI TO DUFLI.

IN the third number of the *Bulletin of the Egyptian Geographical Society* have been published four maps of the Nile from sketch surveys of General Gordon. These we reproduce on a reduced scale and on a single sheet. On the originals Dufli is placed in lat. 3° 34′ N., long. 32° 20′ E.; Magungo in lat. 2° 16′ N., long. 31° 30′ E.; Fauira in lat. 2° 12′ 35″ N., long. 32° 20′ E. There are degree lines on three of the maps, but they are so evidently incorrect that we felt bound to discard them. The fourth sketch, which gives the Nile between Mruli and Fauira is supposed to be drawn on a scale of 1:320,000, and the direct distance between the two places named amounts to no less than 62 geographical miles. We have preferred placing Mruli in the position it occupies on Baker's map, viz., lat. 1° 40′ N., thus reducing this distance to nearly one-half. There are hardly any names upon the maps, and they differ so essentially from preceding maps, that it is by no means an easy matter to place upon them the names of villages and other localities mentioned by preceding travellers. This lack of names is most annoying in the case of the Nile between the Mwutan Nzige and Dufli, the more so as Gessi was one of the exploring party, and might easily have identified the places inserted upon his own map.

Lieut. Chippendall was the first European who crossed the Nile between Dufli and the Mwutan Nzige. On the 3rd March, 1875, he reached that river overland in about 2° 30′ N. lat., where it is 450 yards wide and runs two knots an hour. He crossed over to Fashoda, a village of the Koshi, whose chief was Wadelay.* The river is described as winding about very much and as forming a shallow lake to the south, dry during the greater part when the water is low. The big lake was said to be three days' easy march to the south. Above Fashoda the river was said to split into two branches, one coming from the lake, the other from Magungo. Dongolani soldiers, who had once been on a raid in the country of the Lour, to the west of the Koshi, told Chippendall that they saw these two branches from the hills there. There cannot be the least doubt that the bifurcation referred to is the same as that noticed by Gessi a year afterwards, but whilst the latter says that this branch flows towards the N.N.W., the information collected by Chippendall tends to show that it, too, like the main stream, derives its origin from the lake, and converts the hilly countries of the Koshi and Lour into an island. General Gordon did not notice this branch, but expresses a belief in its existence. Chippendall tells us that the natives of Fashoda were mostly naked,

* This chief's name will be found on Gessi's map in *Geographical Magazine* for September 1876.

but that a few wore skins of goats round the loins. Nearly all wore a ring through the upper lip.* Gessi ascended the river from Dufli to the lake in March 1876. The ascent occupied ten days, owing to contrary winds, incessant rains, and the current. The distance he estimates at 164 miles, and the river throughout is described by him as being navigable, deep and broad, the width in certain places exceeding 700 yards. The natives he found clothed in skins of antelopes or goats. The country was fertile. The principal products were millet, sesamum, honey, tobacco bananas and beans. Cattle were abundant.

General Gordon ascended the river in July 1876, in a steamer. Measured on his map the distance from Dufli to the open lake is 110 miles, and thence to Magungo 21 miles more, or a total of 131 miles as compared with the 168 miles of Gessi. About 20 miles below Dufli the river begins to widen, and the current becomes less rapid, amounting to no more than half a knot an hour. There are numerous islands covered with papyrus, which also fringes the banks and renders landing difficult. The country is populous and the natives are well disposed. Fifty miles below Dufli they wear a skin, but lower down they clothe themselves in the bark of a tree. The banana is cultivated between the 40th and 50th mile below Dufli, and again near the lake. The latter is sad and deserted in appearance, and thousands of papyrus islands render it difficult to find the entrance to the Victoria Nile. This river may be navigated to the foot of the Murchison Falls, but from that point to the Karuma Rapids, below Fauira, navigation is rendered impossible by numerous strong rapids.†

THE LATE CAPTAIN J. E. DAVIS, R.N.

By the sudden death of Captain J. E. Davis, a severe loss has been inflicted upon Hydrography. A man of such well-known and long-tried experience can ill be spared at a time when the number of naval officers skilled in nautical surveying can be counted with ease upon the fingers. Captains Davis and Evans (the present hydrographer) were the last of the stock of old Masters R.N. selected by Sir Francis Beaufort and Admiral Washington for scientific duties at Whitehall. Captain Davis has gone. Captain Evans alone remains. For about forty years the former officer had been doing his best to add to the efficiency of the Admiralty charts. In 1835 he was working in H.M.S. 'Beagle,' and received the thanks of Sir Francis Beaufort for his assistance in the "splendid survey" of Captain Robert Fitzroy.

Between 1839 and 1843 he served in the 'Erebus,' Captain Crozier, in the Antarctic Expedition under Sir James Ross, an adventurous voyage, in which many interesting and important additions were made to our scientific and geographical knowledge. On his return to England, Captain Davis, who was an excellent draughtsman as well as a scientific seaman, having executed the charts and drawings of the Expedition, was again thanked by Sir Francis Beaufort and promoted to the rank of Master R.N. From 1844 to 1864 Captain Davis was employed in surveying the west coast of Ireland and south coast of England, with the exception that, in 1860, he was lent by the Admiralty to do duty as Surveying Officer of the yacht 'Fox,' under the command of Captain Allen Young, during her cruise to Greenland.

In 1863 Captain Davis joined the Hydrographical Department of the Admiralty as a Naval Assistant. The important duties he at once undertook may be best described by quoting from Admiral Richards's sketch of the department:

"The Second Naval Assistant performs duties of a miscellaneous but most important character; he acts as the curator of all the original documents in the department, amounting to about fifty thousand; he enters and marks with particulars every original chart or other document that is received, and sees that they are catalogued and placed on their proper shelves. The distribution and recataloguing of the whole of the original documents on an improved system is now being undertaken—a work long required, and involving much care, labour, and time. Under the direction of the Chief Naval Assistant, this officer also prepares for publication all notices of dangers, of new lights, of any changes which require to be known very promptly; these are very numerous, and are termed 'Notices to Mariners.' He has charge of the Admiralty instruments, and keeps an account of their issue to and return from surveying vessels, and consults with the hydrographer as to new purchases and repairs, also of deep-sea sounding gear."

The observations connected with deep-sea soundings all passed through his hands, and he was intrusted with the publication of the results of the deep-sea explorations made in the 'Challenger' by Captain Nares.

The singular ingenuity of Captain Davis was of great service to the country when deep-sea sounding became a prominent part of the duties of a Nautical Surveyor. The various mechanical contrivances for obtaining the depth, the nature of the bottom of the sea, and the temperature at different depths, all passed under his able superintendence. He was to be found at Chatham Dockyard arranging the style and manufacture of the sounding line; at Whitehall receiving and listening to inventors with a kindly patience; or with Mr. Casella, in Holborn, testing the amount of pressure that could be borne by deep-sea thermometers. The 'Challenger' Expedition owed much of its success to the excellent deep-sea thermometers with which it was provided; these were prepared by Mr. Casella, under the supervision of our ingenious Captain. Davis's "accumulator" plays an important part in the outfit of any ship fitted to obtain deep-sea soundings. The common telescope has been improved by a simple invention of the Captain's for opening and shutting the shade that protects the eyepiece; while the sextant has received from his fertile mind a useful addition to the mechanism for reading the arc.

Our industrious sailor had also found time to devote his attention to literature useful to his brethren of the sea and travellers on the land. The *Athenæum*, the *Nautical Magazine*, in common with this journal, will feel with regret the loss of Captain Davis's instructive contributions. In completing the *Azimuth Tables* of his old friend and colleague Captain Burdwood, and with the assistance of his son, Mr. Percy Davis, of the

* *Proceedings of the Royal Geographical Society*, vol. xx.

† For Gessi and Gordon's accounts, see *Proceedings of the Royal Geographical Society*, vol. xxi., and *Bulletin of the Egyptian Geographical Society*.

Nautical Almanac Office, carrying on those tables from the parallel of 30° to the Equator, a simple and ready method of determining the deviation of the compass has been placed in the hands of seamen; and as long as iron plays an important part in ship-building, so long will the names of Burdwood and Davis be held in grateful remembrance by sailors who take pride in the safe navigation of the vessels intrusted to their charge.

The above list of services form a fair roll, and would entitle Captain Davis to the thanks of a maritime nation; but there was yet another field in which our indefatigable sailor was also eminently successful.

Few who have had the good fortune to hear them will forget his carefully prepared and admirably illustrated Arctic lectures. These interesting discourses were given in many parts of the country; and as he never talked over the heads of his audiences, but confined himself to a simple description of Arctic life, with its many alternations of trial and triumph, of danger and delight, enlivening the same with pithy anecdote and good-natured humour, these lectures became deservedly popular. They encouraged that spirit of maritime enterprise which forms so important an element in the composition of our national character. Englishmen delighted to listen to the stories of their forgotten worthies; and even in this prosaic age, we may compare our absent friend, in these lectures, to some minstrel who—

> "So well
> His legendary song could tell—
> Of ancient deeds, so long forgot:
> Of men whose memory was not."

In the autumn of last year the scientific world heard with some surprise and regret that Captain Davis had retired from the Hydrographic Office. Without entering into details, it may be sufficient to observe that, after circumstances that had occurred, he could not have remained in the office without making a sacrifice that would have been attended with a considerable loss of self-esteem. Captain Davis was one of those men

> "Who dared be poor for a' that."

His admirers consoled themselves with the reflection that, although the Hydrographic Office had suffered a loss, the country at large might have experienced a gain. They felt that, freed from the jealousies and vexatious restraints of his official life, their old friend would *now* be able to continue his instructive writing and speaking with all the vigour and breadth they knew him to possess. He was preparing to prove himself worthy of their good opinions, and many hoped to witness his triumphs in the present year, when a higher power intervened. The great Commander-in-chief had need of him, and very suddenly, on the 30th of January, in the 61st year of his age, Captain Davis departed from us. His remains were interred in the Shooter's Hill Cemetery on the 5th February. A few of his comrades stood beside his grave. Captain F. W. Sidney, late of the Australian Survey, Doctor David Lyall, who was with him in the Antarctic Expedition, Staff-Commander T. A. Hull, the Superintendent of Admiralty Charts, and Staff-Commander D. Pender of the Hydrographic Office.

It has in some quarters become the fashion to suppose, that there is but little cause to regret the loss of an able man from any post in the public service, because, through our large population, there are so many anxious to fill his place. We are inclined to consider such ideas as fallacious, that the finding of good and fit men is not so easy a matter as some of our philosophers would have us to believe. The experiences of the past bear witness against the idea that quality may always be found among quantity. Quantity in Greece, Rome, and Venice did not prevent the fall of those States, when quality failed them. In conclusion, we can only trust that their lordships may be fortunate enough to find among the rising young naval officers of the present day one who may possess not only the zeal and ingenuity, but also the amiability and consideration for others which were the characteristics of John E. Davis.

Reviews.

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ACROSS AFRICA.*

THE readers of the *Geographical Magazine* are already well acquainted with the history of Cameron's memorable expedition, with the difficulties he had to encounter, and with the gallant way in which he overcame them. The important work containing the narrative of his journey is now before us, and by this time it has been read by thousands of Cameron's countrymen. In it he relates, in full detail, the numerous incidents of his enterprise, and supplies information respecting a vast region previously unknown. It is Cameron's great merit that he has, with unwearied patience and devotion, accumulated so complete a series of observations as to have given us a really accurate delineation of the whole width of tropical Africa, including a section derived from hypsometrical data. With this firmly established basis on which to build his narrative, the value of what he has to tell us is increased a thousand fold. As a scientific observer, he stands first among the foremost explorers of tropical Africa. He has now proved that he is well able to tell the story of his travels, and, in a manly, straightforward style, he narrates the numerous eventful incidents of his long and toilsome journey, and describes the scenery, the physical features, the products, and the inhabitants of the regions through which he passed.

In our number for February 1876 (p. 29), we gave a general account of Cameron's previous labours, and an outline of the results of his march across Africa from the east to the west coast, our article forming, in part, a summary of several previous articles on his expedition. At page 274 of *Ocean Highways* for December 1872, we recorded his former services, and at page 486 (March 1874), we enumerated and described the extraordinary difficulties with which he had to contend, and which he overcame at the outset. The exact nature and full extent of those difficulties are not generally known, and perhaps never will be known. But those which are publicly recorded are sufficiently formidable, and show the indomitable pluck and cool intrepidity of the young sailor. We

* *Across Africa*, by Verney Lovett Cameron, C.B., D.C.L., Commander Royal Navy, Gold Medallist R.G.S. Two vols., with numerous illustrations. Daldy, Isbister & Co. 1877.

have so fully described the geographical work that was achieved by Cameron, in former numbers of this Magazine, and its bearing on the general progress of African discovery, that it now only remains for us to give some account of the book, in two volumes, which records the history of a great feat in the annals of exploring enterprise.

The first volume, divided into nineteen chapters, takes us over the ground from the east coast at Bagamoyo, to Nyangwé on the Lualaba. The narrative of the journey to Unyanyembe is extremely interesting, conveying a vivid idea of the difficulties in the way of progress of the people and the country. Burton's admirable and exhaustive treatise will always stand first as a lucid geographical description of this region, but Cameron's narrative is undoubtedly the best that has been written in a popular style, and will thus supplement the work of his illustrious predecessor. After leaving Unyanyembe, Cameron entered upon an entirely new country; every march he made entailed a discovery, and consequently his narrative increases in interest. On the way to Lake Tanganyika he discovered several of the southern tributaries of the Malagarazi and the region they water. His voyage round the southern half of that lake, including the discovery of the Lukuga outlet, was full of incidents, and the account of it will be read with unflagging interest. Then follows the march across the country of Manyuema to Nyangwé, on the shores of the Lualaba, the furthest point reached by Livingstone. Cameron describes the forest scenery of this part of Africa as very beautiful. His text is plentifully illustrated by woodcuts, including careful drawings of the arms and implements of various kinds, which will be valued by students of ethnology.

Nyangwé, the permanent Arab settlement on the Lualaba, was the point beyond which Livingstone was unable to advance; and here, therefore, the interest of Cameron's famous march culminates. The seventeen chapters of his second volume contain the story of his advance from Livingstone's furthest point, right across Africa to the shores of the Atlantic. In this portion all the ground is new, and a region previously entirely unknown is for the first time brought to our knowledge.

In his final chapters Captain Cameron gives a lucid general description of the physical features of this section of the great continent of Africa, and discusses the important questions relating to commerce and the abolition of the slave trade. This portion of tropical Africa consists of a central plateau, the lowest part of which is the valley of the Congo, separated from low tracts fringing the coasts by chains of mountains. Thus the region consists of three divisions, the low-lying and unhealthy littoral, the mountain ranges, and the central plateau. He describes each of these divisions, and then discusses the questions relating to the tropical lake region; and records his observations and the information he collected respecting the Lualaba and Congo, and their affluents. Cameron's last chapter is devoted to a discussion of the present state of trade and communication in the portion of tropical Africa which he traversed. Besides a small local trade on the east coast in gum-copal and grain, the only articles now exported from either coast are slaves, ivory, beeswax, and india-rubber, and of these slaves and ivory occupy by far the most prominent position. The trade routes are first by land to the east coast ports in the hands of the Sultan of Zanzibar as far as Cape Delgado, and of the Portuguese thence to Delagoa Bay; second, the Nile route; third, the routes to the west coast by Bihé and Kasanji; and fourth, a route southwards, through the Transvaal to Natal. The whole trade is at present dependent on human beings as beasts of burden; valuable labour, which might be profitably employed in agriculture or in collecting wild products, being thus wasted. At page 323 of volume ii., there is a *facsimile* of a curious bill of lading for slaves from Loanda. Here the slaves are invoiced as "*volumes*," that is bales of goods, and opposite to each "*volume*" is noted the marks on the person by which it (he or she) may be known. Cameron believes that ivory will not last long as the main export from Africa, and that the slave-trade is doomed. He, therefore, looks to legitimate commerce as the means of opening up the country, and civilising the people; to the growth of sugar-cane, cotton, coffee, tobacco, oil seeds, pepper, and corn; and to the collection of india-rubber, beeswax, and copal. He also describes the mineral wealth of the country he discovered. He suggests that trading stations should be established on a trunk route across the continent, commencing from both coasts; and he is sanguine that legitimate trade, thus steadily and perseveringly advanced, will check the traffic in human flesh and eventually destroy it. "Let us," he concludes, "work soberly and steadily, never being driven back or disheartened by any apparent failure or rebuff; but should such be met with, search for the remedy, and then press forward all the more eagerly. And so in time, with God's blessing on the work, Africa may be free and happy."

Few men have done more useful work in furtherance of this great object than Verney Lovett Cameron, and the noble profession to which he belongs has just reason to be proud of his memorable achievement—an achievement which was as bravely and gallantly performed, as it is now efficiently and modestly described.

BEYNEN'S EDITION OF THE VOYAGES OF BARENTS AND THE VOYAGE OF THE 'GLOW-WORM.'*

THE Hakluyt Society having found it necessary to issue a second edition of the three voyages of William Barents to the Arctic regions (1594-96), by Gerrit de Veer, the editorial work was undertaken by Lieutenant Koolemans Beynen, of the Royal Netherlands Navy. This gallant young officer accompanied Captain Allen Young in two voyages up Baffin's Bay on board the 'Pandora,' and thus, in addition to much careful literary research, he brought a practical knowledge of ice navigation to the work of editing the records of the exploits of his countrymen in the Arctic regions.

The first edition was printed in 1853, and edited by Dr. Beke, with a learned introduction which, at the

* *The Three Voyages of William Barents to the Arctic Regions*, by Gerrit de Veer. First edition, edited by Charles T. Beke, Phil.D. (1853). Second edition, with an introduction, by Lieutenant Koolemans Beynen, Royal Netherlands Navy. (Hakluyt Society, 1876.)

period, was as complete as could be desired. But since 1853 Spitzbergen and Novaya Zemlya have been circumnavigated by the Norwegians; the house in which Barents and his companions wintered has been found, while the researches into the Netherlands archives have thrown much new light on the proceedings of the early Dutch Arctic explorers. For the second edition, therefore, Lieutenant Beynen has written an introduction, in which he gives the results of subsequent researches.

One of the most interesting points on which the later editor dwells is the history of the career of Oliver Brunel, the father of Dutch Arctic discovery, concerning whom a great deal more is now known than when Dr. Beke wrote in 1853, thanks to the industrious and intelligent researches of Mr. S. Muller Fz:—the historian of "De Noordsche Compagnie." Dr. Beke had supposed that Brunel and Alferius, both names which occur in the history of Dutch northern enterprise, were two different people. Mr. Muller has satisfactorily proved that Brunel and Alferius were one and the same man; and Lieutenant Beynen recapitulates his arguments. Brunel was born at Brussels, and, escaping from the tyranny of Alva, he came over to Holland. In 1565 a Dutch ship sailed from Enkhuizen, and formed a settlement at Kola, whence Brunel was sent to Kholmogory, a town near the English factory in the White Sea, to learn the Russian language, and collect all possible information respecting the best manner of establishing commercial relations. Thus he was not only the first Dutch Arctic navigator, but the founder of the White Sea trade with Holland. He was seized by the Russians and kept a prisoner at Jaroslav for several years, until the Czar liberated him, at the intercession of the brothers Anikiew, merchants belonging to the commercial house of the Strogonoffs. Brunel afterwards passed through the territory of the Samoyedes to Siberia, and also made a voyage by sea to the Ob River. On one of these expeditions he discovered the Kostin Shar. Afterwards, as commercial agent of the Anikiews, he opened an annual communication by sea between Kola and Holland. This led to the voyages sent out by Balthazar de Moucheron, and to the establishment of a trading factory, round the site of which rose the city of Nova Kholmogory or Archangel.

In 1581 Brunel arrived in Holland, and proposed to De Moucheron and others the equipment of a vessel with the object of discovering a north-east passage to the Indies. The ship was fitted out at the expense of De Moucheron, and sailed from Enkhuizen in command of Brunel in 1584. But he was most unfortunate, and, after trying in vain to pass through Pett Strait, his vessel was wrecked at the shallow mouth of the Petchora. Feeling that the Dutch at that time were unable to assist him in making a new effort, and not daring to return to the Russians, Brunel then offered his services to the King of Denmark, and made three voyages to Greenland with Knight. There is also reason to think that he was in the English Arctic Expedition with Knight, and that he was the Oliver Browne (Brownel?) who completed the journal after his commander was lost, as related in Purchas, (iii., p. 831). The manuscript of Knight's ill-fated voyage in still preserved in the Geographical Department of the India Office, with the note added by Oliver Brunel, after the disappearance of Captain Knight. The subsequent history of Brunel is lost to us; but we are much indebted to Lieutenant Beynen for having furnished to English readers so full and interesting an account of one of the earliest and most persevering of Dutch Arctic worthies.

The account of Brunel is a fitting prelude to the editor's remarks on the voyages of Barents, some of which are of great importance. For instance, Lieut. Beynen has conclusively proved that Drs. Beke and Petermann were wrong in supposing that, in his third voyage, Barents circumnavigated Spitzbergen, by quoting from an extract taken from a log, probably of Barents himself. The true track of Barents does not go north along the east coast, as Dr. Petermann showed it, but along the west coast. The same view had already been taken by Mr. Asher, in his edition of the voyages of Hudson.

Subsequent research has added nothing to Dr. Beke's introduction, as far as the further voyage of Barents is concerned; but Lieutenant Beynen gives the results of several succeeding Arctic expeditions undertaken by the Dutch, after the return of the survivors of Barents' heroic companions on the 29th of October, 1597. He then proceeds to notice the voyages of Norwegian walrus hunters in more recent times; of Carlsen and Palliser, of Johannesen in 1869, of Torkildsen, Ulve and Mack; and lastly, the voyage of Elling Carlsen in the sloop 'Solid,' who, on September 9th, 1871, discovered the house in which Barents wintered 274 years before. We have already given an account of this discovery and of the relics that were brought home (see *Ocean Highways* for August 1872, p. 157). But Lieutenant Beynen supplies us with a translation of the detailed and most interesting description of these relics by Mr. De Jonge, whose pamphlet on the subject we noticed in a previous number. After the voyage of Carlsen, Captain Gundersen of the schooner 'Regina,' was the first to visit the ice-harbour of Barents on the 17th of August, 1875. In an old chest he found two charts and a manuscript which proved to be a Dutch translation of the narrative of the English expedition of Pett and Jackman in 1580.

In a postscript, Lieutenant Beynen gives an account of the adventurous voyage of Mr. Charles Gardiner, in his yacht the 'Glow-worm,' to the winter-quarters of Barents, during the summer of 1876, a short notice of which was given in our number for December, p. 335. The 'Glow-worm' left Hammerfest on June 23rd, and made her first ice on the 4th of June, about 25 miles to the westward of Goose Land, on the coast of Novaya Zemlya. A continuance of westerly winds had blocked up the west coast with ice, so Mr. Gardiner forced his way into the Matotschkin Shar, and, to his great surprise, found it perfectly clear of ice. On the 25th of July the 'Glow-worm' reached the land-water along the east coast of Novaya Zemlya, and shaped her course across the Kara Sea until she was brought up by a heavy solid pack. Mr. Gardiner then steered north, and entered the ice-haven of Barents on the 29th of July. During the three following days he made a most careful examination of the spot. The ruins of the old house had fallen completely into decay, but, leaving no stone unturned, he made a most interesting collection of more than a hundred different articles. After depositing a record of his visit, Mr. Gardiner left the ice-haven on the

and of August, and shaped his course to White Island. But he was always stopped by impenetrable ice about 30 miles from the land, and unable to make any easting, he was forced to turn the 'Glow-worm's' head to the south. After encountering great dangers in the Kara Sea, he passed Pett Strait on the 23rd, and arrived safely at Hammerfest on the 28th of August.

His collection of Barents' relics consisted of carpenter's tools, broken parts of old weapons, a wood stamp, a leaden inkstand, two goose-feather writing pens, a small pair of iron compasses, a harpoon, twenty well-preserved wax candles, three Dutch books, two coins, and the ship's flag, which is the first European colour that ever passed a winter in the Arctic regions. Mr. Gardiner also found, inside a powder-horn, the manuscript record left behind by Barents, which is still legible. It states the principal events of the voyage, and is signed by Heemskerck and Barents. The signature of the latter worthy was, until now, unknown. Mr. Gardiner, knowing that the other relics brought home by Captain Carlsen were deposited in the Museum at the Hague, and aware of the interest they possess for the countrymen of the great explorer, has most generously presented his collection to the Dutch nation, a courteous act, which is appreciated as it deserves by the people of Holland.

The introduction by Dr. Beke and the text of the journal of Gerrit de Veer are reprinted without alteration in the second edition; the value of which is greatly enhanced by the additional information contained in the new introduction by Lieutenant Koolemans Benyen. If the Dutch navy ever joins in the work of polar exploration, there will be found, in the able editor of the voyages of Barents and the companion of Allen Young, a worthy successor to the great Dutch explorers of former days.

RUSSIA.*

IN concert with all Russians, who assert that their country suffers very much in consequence of the ignorance which prevails in Europe, and especially in England, in respect to themselves and their own affairs, it is the usual habit of English authors of works on Russia to deplore in their prefaces this great want of enlightenment in their own countrymen. Now it cannot be maintained that, as a reading public, we know little about Russia, for the number of English books existing on the subject, published between the fifteenth and the present century, is extremely great; every political crisis in which Russia has prominently figured producing its plethora—as, for instance, the period from 1829 to 1833, embracing the Russian campaign in Poland, and the first few years following after the Crimean War. The character of the Russians and their organised life have been so exhaustively treated, that the Russians, it would appear, have no just cause to complain as they do. And if they desire to be more intimately known, in order that European opinions regarding them may be remodelled, then they should endeavour to bring about that social fusion by which means alone one people becomes familiarly acquainted with another. There are, however, so many causes to militate against this, that no attempts, not even those of hosts of paid agents, could possibly make any approach to success. On the contrary, experience has shown that this social estrangement between England and Russia has increased rather than diminished, the repelling causes in Russia being only too palpable—as, for instance, difference of standard of all guiding principles of action; dissimilarity in habits of life; more than discouraging results following almost every attempt that has ever been made to enter into any kind of enterprise in Russia, &c. Is it apathy and indifference with regard to Russia and her domestic affairs which prevail in Europe, or is it something more? Without entering into a lengthy inquiry into this matter, it may be said that Russia is apparently regarded by us in a twofold aspect; one aspect being the governmental, the other being so obscure by the lack of the faculty of assimilating itself to the European model, that on becoming thoroughly well-known by study, it is put away from all further consideration, while the governmental aspect is ever offensively obtruding itself on our notice. And here it may be appropriately observed in the words of an outspoken Scotsman, "Autocracy can only exist in a state of complete isolation. It can have no friendships, for friendships imply sympathy and even equality."* It is impossible to account in any other manner for the indifference to all but sensational things in regard to Russia.

Let us again take the example of any one of those writers on Russia who lament in their opening pages that ignorance which they set themselves to dispel. The accusation of ignorance might perhaps with more justice be brought against those who profess to enlighten us for the first time, evidently ignoring, if not losing sight of the fact, that they are only reiterating for the hundredth time what had already been fully expounded. In the second place, is a reiteration calculated to stimulate that interest which, it is pretended, is so very desirable? But an interest to be beneficial must show itself in a practical form, and a thousand editions of a work may be sold without having the much-desired effect, if the conviction still exist that the repellent causes above alluded to preclude all possibility of social intercourse, which must be based on a reciprocity of interests.

But are the Russians really sincere in the expression of their desire that we should know them better by examining them closer? What are the proofs of this? They have been very faithfully described by many; their characteristics, their social life and organisation, their institutions, their policy, have all been pictured and illustrated with photographic fidelity. And what has been the result? Those who, for the benefit of the world, have so described them, sowing the truth, have only reaped obloquy. You may be told and know all things in Russia, where all with one voice unofficially will complain of the rampant evils in the country; but if reconveyed publicly, your information will be pronounced to be all false, and you yourself will be disavowed by Russian society, which is nothing if it is not official; for every one member of Russian society is responsible, as Mr. Mackenzie Wallace is

* *Russia*, by D. Mackenzie Wallace, M.A., Member of the Imperial Russian Geographical Society. (Cassell, Petter and Galpin, 1877.)

* Duncan's *History of Russia*, vol. ii., p. 285.

probably aware, for any opinions he may be known to have enunciated, to the third section of His Imperial Majesty's Chancery. Thus the Russians are prone to say, in the same breath, "Know us better and be our friends," and "Preserve us from our friends."

Whether Mr. Mackenzie Wallace was induced to visit Russia by what he had heard of that country or by what he had read about it we are not told, but we presume he had no great interest in it when he set out, for we read in the opening lines of his preface that, arriving for the first time in St. Petersburg in March 1870, with the intention of spending merely a few months in Russia, he *unexpectedly* (the italics are not his) found so many interesting subjects of study that he remained for nearly six years. The result of this visit to Russia is a work of undoubted merit; but without fear or favour, we unhesitatingly say that there is nothing new in it, except that it is much better written than any modern work on that country. As a serious work for the student of Russia it is not equal, though it may serve as a corollary, to the standard works in the field of similar inquiries; for the student of facts will assuredly learn more from the Parliamentary Blue Books on the land and peasant questions as they now stand since the emancipation of the serfs. If Mr. Mackenzie Wallace has written merely to entertain, his success, we fear, will be partial and fleeting. He writes cleverly, and everybody will read his book with pleasure and with profit; but putting the entertainment aside, we would caution all those who would make a serious study of his book, and seek to draw from it certain principles for their guidance, that, impartial as he may have endeavoured to be in his investigations, he has placed himself under restraint in all his opinions in reference both to Church and State. He has exercised throughout a most peculiar caution, striving to bear in mind that discretion is the better part of valour; this is because he has been so entirely dependent upon and so greatly indebted to persons who are all of that responsible class already alluded to. He seems to have feared to tread, and yet in a way he has boldly rushed. The result is, most obviously, that while he halts much and tries his best to throw a roseate colour over all he describes, he so strongly confirms the opinions of the several Imperial Commissions that, notwithstanding the most favourable notices of his book which have been sent to Russian papers by English reviewers, he himself, with his evidence, will cause much irritation to his friends, and will perhaps be after all repudiated.

In all cases where Mr. Mackenzie Wallace might properly have founded a deduction, formed an opinion, or ventured a prognostic, he "leaves it to time," "finds it impossible to say," "reserves his judgment," "is not prepared to say," &c. After six years of close scrutiny into the present state of Russia and of retrospective inquiry through the whole of the period since the emancipation of the Russian serf, it would have been very much to the point to have expressed a decided opinion as to the results of that great and glorious act. Travelling over the country as he did, visiting Ivanofkas great and small, having had the benefit of so many oral, verbal, and written illustrations of the working of the various rural systems of peasant self-government, and having, above all, assisted even in commissions of inquiry, and possessing, possibly, more evidence of commissions than we are informed of in his book—Mr. Mackenzie Wallace might surely have shown more courage (there is no question of modesty) than he does in simply giving us half-digested matter. Has Mr. Mackenzie Wallace studied the Blue Books containing Mr. Michell's Reports on Land Tenure in Russia, and others? If he did so, why does he lag behind the opinion of the highest English authority on the subject, officially given?* If he has been assured that a similar truthfulness—a reproduction simply of purely Russian data—would be distasteful, or if he has felt that the plain unvarnished truth would be unwelcome even to those who assisted him in learning it, he may rest assured that his book, as it stands, will nevertheless be regarded in Russia with much disfavour; and reading it, Mr. Mackenzie Wallace's Russian acquaintances and *collaborateurs* will still repeat, "Preserve us from our friends."

That Mr. Mackenzie Wallace has come to know Russia very well is an evident fact; it would, indeed, be doing scant justice to his faculties for observation, and one who is very cautious is ordinarily very 'cute to doubt it. He very pertinently observes, at page 315 of vol. ii., that "testimony, when given to foreigners in Russia, is by no means unbiassed." And, indeed, throughout the whole of his work on Russia we detect a marked vein of disenchantment from the day on which the author first embarked on the ocean of rural life and investigations in Russia. He considers that autocracy was never stronger in Russia than it is now; but reading between the lines, and by the light of much information which Mr. Mackenzie Wallace surely possesses, we see a very melancholy picture in his description of the country of his special study. Reading of the effects of emancipation, of communal self-government, &c., in Russia, the following phrase grates peculiarly on our nerves and tends almost to shake one's faith in the value of that emancipation which should have regenerated Russia. "He (the peasant) must have food for himself and his family, and the rural authorities are threatening *to flog* him or to sell his cow, if he does not pay his arrears." Although Mr. Mackenzie Wallace wavers much in his opinion—from his book we gather positively that the landed proprietors have not improved their material condition since the emancipation; he is bold enough to say that the improvement is not apparent; that as regards the former serf little or no amelioration has taken place in his condition. We do here get so much of an opinion, although, again, "the question is difficult to answer." We would here call Mr. Mackenzie Wallace's attention to the fact that Russian opinions, as expressed in most of the reports of Imperial Commissions and in letters to Russian papers, are more decided than his own and more suggestive.

Where did Mr. Mackenzie Wallace find that the Russian priesthood have been commonly supposed to exercise an enormous influence over the people? We take it that the common opinion in England has been quite the reverse, and we agree with Mr. Mackenzie Wallace that it would be an entire mistake to suppose such a thing. For it is repeatedly urged upon

* *Vide* Reports from Her Majesty's Representatives respecting the Tenure of Land in the several Countries of Europe, 1869-70. Parliamentary, 1870 (c. 75).

the Russian Government that the effect of the priesthood on the peasantry is demoralising in the extreme, that the churches are all emptying fast, while holy days, drunkenness (zapoyem), theft, and all sorts of immorality are growing frightful, and form the subject of very grave official deliberations.

We have pointed out that an exposition of the true condition of Russia is a most ungrateful task, and we refrain therefore from saying anything more from our own knowledge. We would, however, remark in conclusion, that instead of publishing new books, however readable, containing the results of independent inquiries, it would be quite as well, and perhaps better, to republish the Blue Books on Russia in octavo, and to bring out a digest of all that has been written on Russia either in England, in France, or in Germany, since Russia first came into notice, or played a prominent part in the family of European States, with annotations showing wherein and to what extent Russia has altered and improved.

The following passage, for instance, taken from Duncan's *History of Russia*, 1857, vol. ii., p. 284, might advantageously be corrected up to date. We introduce it as an example, more especially because it bears on what Mr. Mackenzie Wallace wafts as it were in the form of incense in the face of his Russian friends.

"The autocracy of Russia has nothing to fear from the serfs. They are taught by the priests that the Emperor is both a temporal and a spiritual ruler, and that to question his mandates is blasphemy. Much also has been done to ameliorate their condition, and of this they are sensible. Their obedience, therefore, is secured by religion and gratitude, and they indulge the hope of future emancipation. When the absolutism of the Czars is subverted, the blow will have been struck by the aristocracy, as *chiefs of the military force, for simply as an ennobled order they have no weight in the country, no influence over public opinion.*"

ROBERT MICHELL.

THE COUNTRY OF BALOCHISTAN; its Geography, Topography, Ethnology, and History, by *A. W. Hughes, F.R.G.S.* (George Bell & Sons, 1877.)

BALOCHISTAN is a region of which very little is generally known, while its extent and its position give it importance both from a geographical and a political point of view. In modern times the journeys of Pottinger and Christie first supplied accurate knowledge of portions of Balochistan, and this was supplemented by the information collected during the Afghan war, and by Mr. Masson. But Major John Jacob, who became Political Superintendent of the Upper Sindh frontier in 1847, is the man to whom the present connection between Balochistan and British India is due. He it was who founded the now flourishing station of Jacobabad, who negociated the Treaty of 1854, which is still in force, and by whose advice the office of British Resident at Kalat was created in 1856; Sir Henry Green being the first Resident. Since that time the State of Kalat has been a dependent frontier power, and its western boundary towards Persia was recently settled by Sir Frederic Goldsmid. In the present volume Mr. Hughes, whose admirable *Gazetteer of Sindh* has already established his position as an excellent compiler, furnishes a general account of both Persian and Kalati Balochistan, The chapters describing the physical features and products of the country, and those giving general descriptions of the several provinces, are carefully written after a study of all accessible authorities; and they are followed by two chapters on the political history of Balochistan. Mr. Hughes has very appropriately dedicated his little work to Sir William Merewether, the present Commissioner of Sindh, and most worthy successor of Sir John Jacob.

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DIE BEVÖLKERUNG DER ERDE. Von *E. Behm and H. Wagner*. IV. (Supplement to Petermann's *Mittheilungen*.)

THIS annual publication is a mine of wealth to all those engaged in statistical inquiries. The authors do not content themselves with giving the results of the latest censuses, but they also notice all changes of boundaries, whether brought about by treaty or otherwise. Estimates of the population of towns or countries incidentally given in books of travel or newspapers are likewise recorded in this valuable annual. The present number contains an elaborate abstract of the Census of India, more complete and trustworthy than official compilations of the same kind. This portion of the volume is illustrated with a population map of India and with a map showing the complicated territorial arrangements in Central India. The latter is based upon a map prepared by Mr. Saunders for Mr. Markham's "Report on the Moral and Material Progress of India," and the authors repeatedly express their obligation to the Geographical Department of the India Office for having communicated to them useful information.

Area and population of the earth are stated to be as follows:

	Area sta. sq. miles.	Population.
Europe	3,830,620	309,178,500
Asia	17,291,140	824,548,500
Africa	11,557,520	199,921,600
Australia & Polynesia	3,423,130	4,748,600
America	15,882,320	85,519,800
Total	51,984,730	1,423,917,000

There are throughout the world, 205 towns of more than 100,000 inhabitants. The most populous of these are London 3,489,428, Paris 1,986,748, New York with Brooklyn, &c., 1,650,000, Berlin 1,045,000, Vienna 1,001,999, Canton, Siang-tau, Singan-fu, and Changchan-fu 1,000,000 each, Tientsin 930,000, Calcutta with Howrah 892,429, Philadelphia 817,448, Ching-tu-fu 800,000; Yedo 674,444, St. Petersburg 667,962, Bombay 644,405, Moscow 601,969, Hang-chau-fu (4),800,000, Constantinople, Fu-chow, and Hankais 600,000 each, Glasgow 545,144, Liverpool 521,500, Bangkok, Peking, and Su-chau 500,000 each.

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DIE STRÖMUNGEN IM NORD-ATLANTISCHEN OCEAN, mit besonderer Rücksicht auf den Golfstrom. Studie von *Dr. Konrad Jarz*. Vienna, 1877.

IN a pamphlet of 84 pages, Dr. Jarz, formerly an officer of artillery in the Mexican Army and at present a teacher in an Austrian gymnasium, examines the various theories which have been advanced to account for the existence of ocean currents. He first describes the ocean currents of the Atlantic and then discusses their origin, this portion of his work being illustrated by several interesting experiments. In his conclusions he differs widely from his predecessors on the same field of research. Equatorial currents, according to him, originate in the rotation of the earth; meridional currents are due to differences of salinity and evaporation. They are deflected, by the earth's rotation, towards the west, not towards the east. We do not believe that the author will make many converts, but his pamphlet contains much interesting matter, and may be read with profit by all those who make the geography of the sea their special study.

Cartography.

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UP to the present time the reduction in the grant for surveying purposes in India does not appear to have affected the rate of publication, for, by last mail, no less than thirty-five new sheets of one-inch maps, besides fifteen sheets of other publications, were received.

Two sheets of the Indian Atlas, already published in outline, have now been issued with the hills.* The only other compiled map is one of the Province of Assam,† with the adjoining native territories. It is evidently reduced from the latest surveys, but the hill features are shown very inadequately, and there is no doubt that a much better map might have been produced. The political boundaries and roads are elaborately coloured, and for general purposes of reference the map must prove very useful.

The Topographical Surveying parties have presented us with seventeen new sheets, executed in the effective manner to which we are accustomed. The Topographical Map of Rajputana‡ has been increased by three sheets, embracing parts of Jeypur, Jodhpur, Kishengarh, and Ajmere, and based upon surveys made in 1873-75, by Captain G. Strahan and assistants. The same officer supplies us with an excellent plan of the city and environs of Ajmere,§ a fine specimen of hill sketching on a large scale in the contoured style; whilst Captain J. R. Wilmer furnishes a less ambitious plan of the Cantonment of Nusseerabad. Six new sheets of the Gwalior and Central India Topographical Survey‖ have been issued, based upon surveys conducted under the superintendence of Capt. G. Strahan. The hills form a fine feature on several of these sheets. The North-Eastern Division of the Central Provinces Topographical Survey¶ presents us with five new sheets, embracing portions of Belaspur, Mandla, Balaghat and other districts, and based upon surveys by Lieut.-Colonel G. C. Depree (1874-5).

We are glad to observe that the officers of the Topographical as well as of the Trigonometrical Surveys have adopted the new and official system of spelling. The Revenue surveyors, on the other hand, persistently cling to the old system, and these maps, as far as nomenclature is concerned, are thus obsolete even at the moment of publication. True, some of the sheets of surveys now in progress may have been already issued when the orthographical edict went forth from Calcutta, but surely this is no reason why the old and condemned system should be persisted in.

The one-inch Revenue map of Goalpara District, Assam,** has been completed by the publication of sheets 14, 15, 17 and 18, from surveys made in 1873-5 by Major D. Macdonald. The map is a favourable specimen of its type. There are shown upon it villages, temples, mosques, police stations, and bazaars, three classes of roads, masonry pillars and mile stones, trigonometrical stations, electric telegraphs, forests, bush, high grass, and three classes of boundaries. The number of altitudes is limited. From a marginal note we learn that the district has an area of 3960·70 square miles. The Punjab Surveyors supply us with a map of the Delhi District* in seven sheets, surveyed in 1872-4 by Captain W. H. Wilkins. The survey of Bhawalpoor† is making steady progress, no less than ten new sheets having recently been published. They exhibit the characteristic features of that extensive Native State—barren sand-hills in the interior, well-cultivated tracts, with numerous towns and villages near the Indus. We are indebted for this survey to Messrs. E. T. S. Johnson and J. Campbell, and to Captain D. E. Andrew.

The Revenue surveyors in the Central Provinces limit their contribution this time to a plan of the Fort of Deogurh in the Chindwara District.‡

The officers of the Trigonometrical Survey in India,§ under the able leadership of Colonel J. T. Walker, supply us with five sheets of levels in the Punjab, the Lower Provinces, and Audh, compiled from canal and other surveys, and combined with the operations of the great Trigonometrical Survey. We trust that the numerous altitudes inserted upon these sheets will find their way into the Topographical and Revenue maps.

We are indebted to Mr. Alexander Murray for a capital Geological Map of Newfoundland,‖ exhibiting no less than twenty-two different formations, all of them clearly indicated by colours and letters. Laurentian and Huronian rocks appear to occupy about one-half the area of the island, whilst the beds of Silurian formation, which overlie them, occupy nearly the whole of the remainder. There are two coal basins, the one near the south-western extremity of the island, the other in the interior, to the north of Grand Pond. The Devonian formation is limited to a small island. Eruptions of volcanic rocks have taken place in the centre of the island, in a direction running from north-east to south-west.

Another edition of the same map indicates the tracts now known to be more or less fit for settlement. In proportion to the area of the island these are but of small extent. They embrace several small patches in the south-eastern peninsula; an extensive tract stretching from Gander Bay southwards to Gander Lake; another considerable tract in the valley of the Exploit River as far as the Indian Lake and the two coal districts. Pines are met with in most of the above. There are, besides, marshlands which might ultimately be brought into cultivation, and which are certainly adapted for grazing cattle.

WE have received from General Stone, the chief of the Egyptian staff, a map of the Nile between Dufli and the Albert Nyanza based upon a *reconnaissance* made by Gordon Pasha in July 1876. The map differs from that published previously in several respects. There is no indication now of an arm of the river flowing towards the north-west. We have also received a map of the route from El Obeiyad to El Fasher, the capital of Wadai, based upon a *reconnaissance* made by Major Prout in 1876, and neatly engraved on stone. Fasher is placed, from astronomical observations, in lat. 13° 37′ N., long. 25° 24′ E. Greenwich. Neither of these maps increases to an appreciable extent our general knowledge of the countries they refer to, but they are nevertheless valuable contributions.

E. G. RAVENSTEIN.

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* Indian Atlas, sheets 2 N.E. and 52 S.E. Calcutta, 1876.

† Province of Assam, 1875, 16 m. = 1 in. Calcutta, 1876.
The same, a photo-lithographic reduction, 24 m. = 1 in.

‡ Rajputana Topographical Survey, 1 in. = 1m. Sheets 54, 55, 56.

§ City and Environs of Ajmere in Rajputana, 1875. Scale, 12 inches to the mile. 4 sheets.
Nusseerabad Cantonment (Ajmere), 6 inches to the mile.

‖ Gwalior and Central India Topographical Survey, 1 m. = 1 in. Sheets 67, 68, 70, 72, 73, 74.

¶ North-Eastern Division of the Central Provinces Topographical Survey, 1 m. = 1 in. Sheets 24, 25, 26, 30, 31.

** Assam Revenue Survey, District Goalpara. Scale, 1 m. = 1 in. Complete in 19 sheets.

* Punjab Revenue Survey, District of Delhi. Scale, 1 m. = 1 in. Complete in 7 sheets. Calcutta, 1876.

† Punjab Revenue Survey, Bhawalpoor State. Scale, 1 m. = 1 in. Sheets 16, 22, 24, 29, 32, 36, 37, 38, 43, 47.

‡ Central Provinces Revenue Survey, Deogurh, District Chindwara. Scale, 12 in. = 1 m.

§ Great Trigonometrical Survey in India, Levels in the Punjab. Sheets 23 and 66.
The same :—Levels in the N.W. Provinces. Sheet 27.
The same :—Levels in Audh. Sheets 28 and 40.

‖ Geological Map of Newfoundland, by Alexander Murray. (Engraved by E. Stanford.)

Log Book.

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The Goodenough Memorial.—The Committee of the Memorial Fund which was raised as an expression of admiration for the character of the late Commodore Goodenough, and of the sense of the loss sustained by the Navy at his death, under the presidency of Admiral Sir Hastings Yelverton, has now decided on the form that the memorial shall take. Each year the interest of the bulk of the money subscribed, together with a gold medal, will be presented to the officer who, having been first in seamanship, passes the best examination in gunnery. The management of this trust will be placed in the hands of the Lords of the Admiralty. A bust will also be executed by Count Gleichen, who was an old messmate of Commodore Goodenough in the 'Raleigh,' which will be placed in the Painted Hall at Greenwich.

In Australia, both among the colonists and among the officers and men of the squadron, the love and admiration for Commodore Goodenough has found expression in several ways. The site of the graves of the Commodore and of the two young seamen who died from the same cause has been purchased. A Sailors' Home, called the "Goodenough Naval House," has been established at Sydney, and a marble bust has been executed for subscribers among the people of New South Wales.

The Dutch Sumatran Expedition.—The members of the Sumatran Expedition left the Helder, on board the fine steamer 'Conrad,' on the 13th of January, 1877, reaching Port Said on the 1st, and expecting to arrive on the 22nd of February. Here they will be met by a civilian well acquainted with the people and the Malay dialect of Sumatra, who will conduct the ethnological and linguistic researches. Lieutenant Schouw Santvoort, the commander of the Expedition, proceeds to Batavia for the steam-launch, which has already been sent out in pieces. She will be towed to the mouth of the Jambi River, where a depôt of coals will be formed.

The Dutch Geographical Society has published a very able memoir by Lieutenant Schouw Santvoort, on all that is now known of the region to be explored, with a map compiled from all existing materials; showing what is to be considered as quite unknown, and what as already explored. An appendix contains extracts from the writings of former English and Dutch authorities, including the journal of Barnes, from a manuscript preserved in the Geographical Department of the English India Office. Thus nothing has been neglected to make this Expedition as complete as possible, both as regards the thorough investigation of all that had previously been done in that part of Sumatra, and the equipment for present work.

Miklukho Maclai on New Guinea. After an extended tour through the Malay peninsula, this Russian traveller visited Yap, Palao and other islands of the Pacific, and then proceeded in the schooner 'Seabird' to his old quarters on the coast of New Guinea. He landed and met with a friendly reception on the part of the natives. They declared that they had confidently looked forward to his return. No vessel had been seen by them since the departure of the 'Izumrud' in December, 1872. An earthquake occurred a few months afterwards, destroying many villages in the hills. In conversing with the natives he found that they had not forgotten the Russian words he had taught them during his previous visit. They readily assisted him in building a house. M. Maclai has taken with him seeds and cuttings of fruit-trees. The maize, introduced by him in 1872, is doing well.

A Russian man-of-war has been instructed to call for the intrepid traveller.

New Sanjaks in Turkey.—Several changes have taken place recently in the political divisions of Turkey. The archipelago has been separated from the vilayet of the Dardanelles, and the new "Vilayet of the Islands" now includes the islands in the Ægean and Cyprus, with Rhodes for its capital. The new vilayet of Constantinople includes the capital, the sanjak of Izmid in Asia Minor, Chatalje, and the Dardanelles. Constantinople itself has been divided into twenty municipal districts, embracing both shores of the Bosphorus and the Princess Islands. In 18 of these districts there are 529 streets and 62,262 houses, and making an allowance for the two others, and assuming that there are ten inhabitants to a house, its population would amount to 691,800 souls. The new vilayet of Kosova includes the sanjaks of Nish, Prizren, Uskub, and Yeni Bazar. The new sanjak of Prishtina includes the kara of that name and several others. The vilayet of Monastir has ceased to exist, it now belongs to Saloniki. The sanjak of Sofia has been incorporated with the vilayet of Adrianople. The Herzegovina has been reunited with Bosnia.

We learn from Lutfi's *History of the Russo-Turkish War of* 1828-29, published recently, that a careful census of the population of Constantinople and its suburbs was taken whilst the Russians blockaded the Dardanelles and the Bosphorus. There were 359,089 souls. This is the only census taken during the present century. Dr. Mordtmann made a careful estimate in 1873 (*Gazette Médicale de l'Orient*, February 1873), based upon the bills of mortality, and estimated the population at 600,000 souls at most. The increase is almost exclusively amongst the Christians, for at the time of the census nearly all the Greeks and many Europeans had left the town. Besides this, there are at present many quarters of the town which were inhabited formerly by Turks but are now in the exclusive possession of Christians.

The Portuguese in Africa.—The Portuguese appear to exhibit an unwonted activity in connection with their African settlements. On the west coast they claim the exclusive navigation of the Congo, and are charged with the design of desiring to appropriate Ambrizette, Landama, and Bandana. An expedition of 120 men left Lisbon on the 11th of December for the east coast, supplied with scientific instruments, arms, stores of every kind, and nineteen wooden houses, to be erected at Lorenzo Marques in Delagoa Bay. Amongst the men of the expedition are twelve carpenters, thirteen masons, three smiths, four sawyers, and thirty military workmen, and they are divided into three detachments, to each of which a surgeon has been attached. The sum of 89,000*l.* has been granted by the Portuguese Government to be expended in public works in the course of 1877.—*Exploration.*

Piaggia's Survey of Lake Ibrahim.—Dr. Petermann has received a map of Lake Ibrahim, sent to him by Carlo Piaggia. This traveller accompanied Gessi's expedition from Dufli to Lake Albert in 1876, and then ascended the Somerset Nile to Mruli, whence he made a complete examination of the lake discovered by Long and named by him L. Ibrahim. Piaggia has made a special map of the lake, which, it appears, is from 32 to 35 miles long from N.N.W. to S.S.E., and 12 to 15 miles in breadth. Its south-western half is studded with islands, while the opposite portion is free from them. The Somerset Nile enters the lake on the north-west (?), and soon emerges again from the northern extremity. Piaggia discovered what he believed to be a second outlet on the north-eastern side, which after a short course loses itself in a network of swamps, and which he accordingly named Massanga. He ventures the theory that it eventually either discharges into the Sobat or into the White Nile by the Makedo Cataracts near Dufli, but it is more probable that this apparent outlet is only a sort of swampy backwater formed during the rainy season, and of no great extent.

Geographical Prize Essays. The Geographical Society of Antwerp offers two prizes of £20 each for memoirs on the following subjects:—

1. History of a Belgian traveller, born or connected by family ties with the province of Antwerp, whose works and discoveries have contributed to the progress of geography. Attention is drawn to Pierre van den Broecke, born at Antwerp about 1580; John Baptist Grammaye, born toward the close of the sixteenth century; Jacques André Cobbe, born in 1682; and Francis Balthasar Solvyns, born in 1760.

2. A description of the Azores (Vlaamsche Eilanden), and history of their colonisation from a Belgian standpoint.

The memoirs must be written in French or Flemish, and must reach the secretary of the Society (37, Rue van Lerius, Antwerp) not later than 31st December, 1877.

Correspondence.

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PROVISION OF CHARTS AND SAILING DIRECTIONS FOR GOVERNMENT TRANSPORTS.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—I forward the following extract from the *Bombay Gazette* Overland Summary of 22nd September, and, concurring entirely with the remarks made on the case, I wish to make some additions of my own to them:

"The 'John Starr' was a large barque bound to Karáchi with a full cargo of porter and railway iron, the property of the Indian Government, and was wrecked on the coast about 9 miles to S.E. of that port on the 1st of last month in long. 67° 2′, lat. 24° 40′. A Court of Inquiry, composed of the Town Magistrate and a master of a merchant-ship, has been held, the judgment of which is 'that it did not consider the amount of blame attributable to the master so grave as to call for the suspension of his certificate,' which was accordingly restored to him.

"We propose to make some comments on this case rather with a view to the benefit of future navigators than with a feeling of harshness to the master, who narrowly escaped with his life, and who, after the catastrophe, appears to have acted with judgment. The following points, some only of which are referred to in the judgment, are those to which we would draw attention: The ship appears from the evidence to have been navigated with *only one chronometer*, notwithstanding which—the far from clear weather, the known lowness of the land southward of Karáchi, and the fine direction bank of soundings extending for 60 miles off that place—no attempt was made to verify the position by taking a cast of the lead, although even, according to the supposed position, the ship was in soundings before noon. Further, the sailing directions all caution a vessel to expect a S.E. current at this season; no allowance was made for this in the course steered. The sailing directions also order a vessel to steer for Cape Monze at this season, and thence to make the port. The course steered at noon from his supposed position should therefore have been fully two points more northerly, to comply with this advice. Either of these three precautions would have saved the ship. The first is the most ordinary step on approaching a coast, and the navigator's conduct was the less excusable in this case as the discolouration of the water must have been very marked for at least an hour before the vessel struck. The other two are clearly indicated by the sailing directions. As land appears to have been visible for some time, it is obvious that there was no such thickness of weather as to account for the disaster—we cannot admit the term accident—and certainly the lead might then have been hove. There does not appear, from the published decision, that any inquiry was made on one most important point. Was the ship or was she not provided with the proper charts and sailing directions for the locality, or had she even an obsolete Horsburgh? Was her chart only one of those general charts of the Indian Ocean bound with blue and sold by an irresponsible ship chandler? It seems inconceivable that the sailing directions and soundings of the charts should have been so ignored, had they been on board. Lastly, if she had not these indispensable requisites for safe navigation, who is responsible for sending a valuable Government cargo in a ship unprovided with these articles to be utterly cast away for the want of them? Surely it must be some one's duty at the India Office to ascertain that ships conveying Government cargo are properly found in this respect. We insist on this point the more as we have heard non-officially that the 'John Starr' was *not* provided with the proper charts and directions. We believe that, on the survey of a ship when taken up by Government, investigation is made on all points except the instruments of navigation. Why should not a stipulation be made in the charter-party that the ship shall be provided with at least two good chronometers and the proper Admiralty charts and sailing instructions? or, if that cannot be done, it might be worth while for Government to expend the few shillings required for the charts, &c., and supply them gratis to the master, especially as it is at no other expense for insurance."

I would especially here draw attention to the concluding paragraph, in the first instance, and ask seriously whether any care, precaution, inquiry, stipulation, &c., are made when a ship is chartered by Government as to her charts and chronometers, or whether it is left to the master to make such provision as he may think sufficient? If Government do not, do insurance companies ever ask such questions, for they are largely interested? It is a curious anomaly if they do not. Royal Navy vessels are not allowed to say what charts they will have; if they go to a certain part of the world, they must take certain charts and sailing directions: why not apply the rule to Government transports? The question is most important, and we earnestly invite attention to it.

Now a few words as to the cause of the wreck. If the *one* chronometer had *not* been 20 miles out, the wreck would certainly not have happened; but the master should have assumed that such an error *might* exist, and should have allowed some margin in the course steered accordingly. The less intelligent class of navigators cannot be too often reminded that chronometers are not infallible, are liable to sudden alterations, and that the result of a solitary chronometer must be received with a certain amount of reserve. There is too great a tendency to accept the result of the day's calculations as an absolute certainty.

I am, &c.,
ARTHUR W. STIFFE.

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THE PECHENEGS.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—The researches of Mr. Howorth are, in spite of the seemingly dry character of the subject, of an undoubted ethnographical value, inasmuch as they bring together facts and analogies of *nomina propria*, hitherto either not sufficiently or not at all regarded as the ethnical classification of the Turks. His newest identification of the Kangli and Pechenegs with the Karakalpaks of to-day, is more than a mere combination, since there is a tradition amongst the Karakalpaks of the Lower Oxus that their ancestors have founded the city of Kazan many hundred years before, and that their migration to Central Asia took place only after the total collapse of the Golden Horde. This is certainly more than a tale, for, in absence of linguistical proofs, the physical peculiarities of the Karakalpaks of to-day give the best link of connection between the Turks known in the tenth and eleventh centuries and their direct offshoot, the Karakalpaks.

Mr. Howorth is anxious to know the meaning of the word Pecheneg or Beshenek, the more ancient mode of spelling. I beg leave to make the following suggestion: I find the spelling of Porphyrogenitos—viz., *Patrinak*, to be nearest to the truth. The Greeks being unable to pronounce the *sh*, we find it substituted by *tr*, restoring consequently the original *bashinak*, *i.e.*, chief (*bash*) prince (*inak*): and thus we have the meaning of the nomen adopted by the whole tribe.

I remain, yours faithfully,
A. VAMBERY,

THE UNIVERSITY, BUDA-PESTH,
February 7th, 1877.

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THE RUSSIAN EXPEDITION TO THE ALAI AND PAMIR IN 1876.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—In the report of the proceedings of the Royal Geographical Society's meeting held on the 8th January last, given in your February number, I am represented as having said that the men connected with my mission went from Chatir-Kul across to Wood's Lake, down to Kilapanja and back to Yarkand. This is an error of the reporter. Instead of Chatir-Kul it should have been Yangi Hissar, from which place Col. Gordon's party started across the Pamir to Wakhan. I should like also to correct a former portion of the report of my remarks, which were misunderstood at the time. When two such eminent authorities as Sir Henry Rawlinson and Col. Yule agree on a matter of geography, it would have been presumption in any one to oppose a different opinion, and on the question of the route of Ptolemy's merchant I did not venture to give a suggestion. But from personal observation, and from all the authorities I had been able to consult, I was and still am of opinion that *a* great trade route existed between Khokand and Kashghar over the Terek Pass from very ancient times. Further than this I hazard no opinion which can be taken to oppose the line taken up by Sir Henry Rawlinson and Col. Yule for Ptolemy's Merchant.

Yours, &c.,
T. DOUGLAS FORSYTH.

44, ONSLOW SQUARE,
6th February, 1877.

Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

Meeting of January 22nd, 1877.

SIR RUTHERFORD ALCOCK, K.C.B., President, took the Chair at 8.30 P.M. The paper of the evening was by the Rev. DR. MULLENS,

ON RECENT JOURNEYS IN MADAGASCAR.

Within the last two years no less than five important journeys have been made by English missionaries over entirely new ground in Madagascar. The first was undertaken by Mr. Shaw, Superintendent of the Normal School in Fianarantsoa to the kingdom of Ikongo in the south-east part of the island. The country through which he passed was one vast uninhabited forest, which Mr. Shaw describes as the thickest he had seen in Madagascar. Birds were the only living things met with, though there were evident traces of wild hogs. About the centre of this forest a pair of curiously shaped mountains rose far above the surface of the plain; the northern sides rise precipitously from the plain to a height of 1000 feet, and the south and west sides are covered with thick brushwood. On the ridge between these two hills the travellers had a splendid view to the south-east. A deep valley lay before them with the hills rising high on the opposite side, all densely covered with trees; and from near the summit of one of them a large stream came tumbling and roaring into the valley. Just before emerging from the forest a slight shower came on which brought down from the overhanging leaves and grass minute leeches. These creatures are able to elongate themselves to nearly four times their natural length; they bite very severely, and cling to the legs and feet most tenaciously. From the summit of a hill overlooking Ambohitsivalana, Mr. Shaw obtained a good view of Ikongo. It consists of

a long flat-topped hill, about 5 miles in length and about 1000 to 1500 feet above the level of the plain. Five towns were seen on the summit, the one to the south having some good-sized houses. Near this southern town two streams take their rise, flowing along the entire length of the hill, descending in a clearly defined cascade near the northern extremity. Mr. Shaw was well received by the king, and it was arranged that teachers should be sent to instruct his people. In June 1875 Mr. Shaw took out the teachers, with whom the king was much pleased, providing them with a house, and his people agreeing to furnish them with rice. On his return Mr. Shaw was permitted to travel by the southern road, thus enabling him to see the whole of the Ikongo country.

The second journey described was to the Ibara tribes, which was made by Messrs. Shaw and Riordan in April last. These tribes live to the south and south-west borders of the Betsileo province. Starting from Ambohimandroso they entered the Ibara Land at the south end of the Betsileo province, and travelling westward crossed the ridge which bounds on the west the great rice plain and also the valley of the Tsimandao. Passing through the granite range called Andringitra they were struck with the wonderful forms, size, and number of the granite masses of which the ridge is composed. Journeying west and south through the well-watered valley of the Isahanambo, they came to Besikaona, which is situated at the entrance of an extensive and level tract of country, extending 30 to 40 miles south, and double that distance east and west. This plain is crossed and recrossed by the Menarahaka river, which rises to the east of the ridge east of Besikaona, and after traversing nearly the whole length of the valley turns south, then east to a point as far as its own sources. Continuing the journey west, Messrs. Shaw and Riordan came to the valley of the Central Ibara, with Ihosy as its chief town. This town stands in the centre of an extensive valley, through which the River Ihosy runs from south to north in its course to the Tsimandao. As far as the eye can reach the country appears to be inhabited, containing about 16 villages. Beyond this district to the south, north, and west is an uninhabited desert, and to the east there are very few inhabitants. Two or three of the kings visited the travellers, and opportunity was taken of speaking to them concerning the ignorance of their people, and their condition contrasted with that of their neighbours the Betsileo, on which they promised to bring about a better state of things. Returning to the eastward, in the neighbourhood of Akaramena, Messrs. Shaw and Riordan passed one of those peculiar rocks in which the graves of the kings have been hewn at a great distance from the ground, the coffins being placed in the back part of the crevice, with the skulls of bullocks in the fore part. With a view to visit the southern Ibara they returned to the granite ridge of Andringitra, near the north end of which they found an extinct crater. Passing south they came into the valley of the Menarahaka and from thence on to Ivohibe, which is considered one of the wonders of Southern Madagascar. It is an enormous isolated mountain, with a level top, standing in the centre of a broad plain, beyond and apparently below the Menarahaka Valley and forming the next terrace towards the south. In appearance and character it is like the fortress-rock of Ikongo, having a lake of spring water on its summit, which overflows and forms a considerable cascade on the northern side. In this plain Mr. Shaw found the best population he had seen in the Ibara. Here his presence caused great excitement, the people rushing out *en masse* to see the Englishman. He was allowed to choose what house he liked, and was plentifully supplied with provisions, &c. Both among the Southern and Central Ibara the way was prepared for the establishment of schools and for free intercourse with other parts of the country.

South-east Madagascar was the scene of the third journey. This was undertaken by Messrs. Sibree and Street in June and July last. They travelled over a great deal of new ground, and careful observations were taken by Mr. Sibree along the route pursued. The new portion of their journey was commenced at the south-east corner of the Betsileo Province, from the hill town of Imahazony. In three hours they entered the forest, the luxuriance of the vegetation of which they greatly admired, and the scene which opened before them on coming out is described as one of the grandest that can be imagined. The principal valley down which they had come opened into a great hollow or bay, 3 or 4 miles across, and more than twice as long, running into the higher level of the country from which they had descended. The hills or rather edges of the upper level rise steeply all round this great bay covered with wood to their summits, which are from 2000 to 3000 feet above the valley. Between these bold headlands four or five waterfalls were counted, two of them falling several hundred feet down perpendicular faces of rock. Between the opening points of this valley could be seen a comparatively level undulating country, with patches of wood, and the windings of the River Matitanana. Proceeding towards the coast along the valley of this river they passed from the districts held by the Tantala, —who are a simple and friendly people—into those of the Taimoro tribes. The country all about is delightful. At the Hova Fort of Ambohipeno Mr. Sibree took the opportunity to get bearings of the neighbouring villages, and on his way to and from the observing-ground met with great numbers and varieties of butterflies, a rich harvest for the entomologist. They were surprised to find in one of the villages (Ivatomasina), where the Arab influence is said to have been very strong in former times, that the people are said to be descendants of Abraham, and altogether Jews, and have many customs derived from the Jews; but what these were could not be ascertained. There is no doubt, however, that the Arabs have at some former time had a settlement here and on some other parts of this south-east coast, and to some extent taught the use of the Arabic letters, which probably gave rise to the statement in some old works on Madagascar that Malagary was a dialect of Arabic.

From Ambohipeno they journeyed south with the view of visiting the Hova Forts of Mahamanina, Ankarana, and Vangaindrano, of which and the surrounding country an interesting description was given. At several points both on the outward and return journeys Messrs. Sibree and Street observed masses of trap rock, scoria, lava streams, and the like, bearing evidence that the volcanic eruptions so patent in the north and centre of the island have not been wanting in its southern districts. Passing a village called Loharano, they came to an extensive lagoon, which appeared to be the first from the south of that remarkable series bordering the shore, and extending northwards, with few breaks, a distance of 200 miles. Along the southern side of this lagoon are enormous blocks of lava rock. Journeying along the sea coast, they at length reached the Mananjara River, and passing one or two towns of interest, arrived at Ambohimanga, the capital of the Northern Tanala, which is situated about 2000 feet above the sea level, where they spent two days. From this resting-place the journey to the capital was easy.

The fourth fourney was to the Western Sakalavas, undertaken by Messrs. Sewell and Pickersgill in June 1875. The starting-point was Mahatsinjo, near Lake Itasy. They had not travelled many hours before all trace of human habitation was lost, and, crossing the River Sakay, an extensive tract of waste land presented itself, covered with long grass, which proved very trying to their feet. Several military stations were passed on the road, at a few of which a short halt was made; but the road all the way presented few objects of interest Crossing the Manambolo, which is described as a really fine river, the road was tolerably level, very often presenting park-like scenery. Here the country seemed to

be quite free from the drizzling rains so common in the east during the winter, producing a great effect on the character of the vegetation. Tamarind trees were conspicuous by their rich foliage; one was found to be 30 yards in diameter, and there were many whose branches extended over a space of 20 yards in width. From Ankavandra they journeyed south to Imanandaza and crossed the Itondy River, which forms a very important branch of the Manambolo, and is surrounded with luxuriant vegetation. For a while they were quite at a loss to know how to get through the tall prickly reeds, which, with a small but deep stream of water, seemed effectually to stop their progress. All the rivers from the Sakay, a long way to the north of Itasy, to the Mania, a large river which flows through the country of the Betsileo, unite in one great river, about 30 miles to the south-west of Imanandaza. At this town Mr. Pickersgill was engaged attending to the sick, fever being very prevalent during the greater part of the year in these low places. Another wearisome journey of four days, under a hot sun, brought them again to Mandridrano, from whence they had set out.

The fifth and last journey was through the Anativolo to Sihanaka west, undertaken in June last by Messrs. Moss and Lord. Anativolo marks the first great fall in the ground on the north side of the central plateau. The plain is shut in east, west, and south, by lofty hills, and extends northwards, with alternations of low and rising ground, at a mean elevation of from 3000 to 3200 feet above the sea, as far as Ambodiamontana. The soil of the whole extent of this large district is of sandy alluvium and red porous clay, easily disintegrated by the action of wind and rain. In many places were seen whole hill sides that had been eaten and washed away by the tropical currents, forming precipices sometimes a thousand feet in depth, and chasms in whose shelter luxuriant forest trees find a congenial habitat, and in which frequently large herds of cattle are fenced off and protected from the cold. Farming and the cultivation of rice, sugar-cane, and manioc form the chief occupations of the people. Crossing the River Mananara, they encamped at the foot of one of the great hills of the northern districts, Voambohitra, which is a magnificent basaltic mass, towering grandly to some 2000 feet above the plain; its summit is reckoned at about 4500 feet above the sea, and in general appearance it resembles Table Mountain at the Cape of Good Hope. At Morafeno, a few miles beyond to the eastward, they encamped on the banks of the Betsiboka, and next day reached the important Hova Fort of Antongodrahoja, which stands on the very verge of a high table-land, and at a height of 4150 feet above the sea, commanding a most magnificent view. From here the ground descends by a precipitous path some 2000 feet to the plain below, after which a good road leads to Trabonjy and thence to Mojunga. Close to it on the east, is the peak of Namakia. It is a place of considerable importance; the people are unusually intelligent, compared with those of other towns, and the rustling of silk dresses, and the display of French hats in the little settlement church, were associated with a fair knowledge of the latest hymns, and a most hospitable and kindly welcome to those who had come to instruct them.

In passing from Antongodrahoja to the Sihamka country the travellers retraced their steps to Tanifotsy, and then eastward. The people met with on the route were lamentably ignorant, and at the village of Antsampandrano the little population of 200, including several soldiers, were so terrified at the sight of two live Englishmen, that they ran away. After resting at Amparafaravola they preferred to cross the Alaotra Lake, which proved a perilous voyage. At last they landed at Antanibao, which is a "strange, uncanny sort of a place." The people are utterly heathen, and many of them had never before seen a white man.

In the discussion which followed the reading of the paper, the Rev. J. PILLANS said all the movements of civilisation and progress in Madagascar had spread from the centre, and the value of what was taking place in the island would depend very much on what was going on in Antanarivo, the capital city, which had a population of about 80,000. That city was to Madagascar even more than what Paris was to France. All kinds of movements began there and spread throughout the country. The great centre of life at present was in the mountains, the capital being situated on a hill 4500 feet high, surrounded by a plain at a level of 4000 feet. It had been supposed by some persons that as civilisation progressed the centre of life might change, and come down to the great plains and seaports. He was glad to be able to say that education, with which the great modern movement in Madagascar began, continued to spread wherever the Hovas' influence was felt. As far as circumstances permitted, the Hovas and the Betsileo people were industrious, and worked hard in their rice-fields; but a great many things prevented the growth of their industry. There were no roads through the island, and even in the capital itself the roads were of the rudest description. There was thus no means of transporting their produce from one district to another. Besides this, there were no beasts of burden except a few scores of Mauritius ponies and a few bullocks and a donkey. There was thus no opportunity for the development of industry. Up to the present time the Government had been afraid that outsiders were very eager to get possession of the country, and they had refrained from making roads, so that any army coming from the coast might find transport very difficult; formerly, however, there was a road leading to the east coast. In one or two ways the people might be helped by foreigners. The country was not particularly rich either in its fauna or its flora. Their chief culture was rice, but they were in want of crops that would grow in the upper parts of the country. Then, they had no sheep. Formerly they had sheep without wool on them, but if they could get sheep whose wool would supply them with clothing, it would be a great boon to the people in the cold highlands. He did not think that the country itself was very tempting to capitalists, and the Government were rather jealous of such people.

Sir BARTLE FRERE said he had only seen Madagascar at two or three points on the north-west coast, at Mojunga and Nossibé, but all present would agree that very few pictures of such extraordinary interest had been presented to the Geographical Society as that to which they had just listened, regarding the great changes which had been wrought in Madagascar since it was first opened to Europeans by the exertions of the missionary Ellis and his brethren and successors. In the days of Marco Polo, Madagascar occupied a very large part of the attention of travellers in the East. From what was stated by Colonel Yule in his excellent notes to *Marco Polo*, it was clear that the Arabs of those days had a great deal of intercourse with the coast of Madagascar; and he believed Dr. Mullens was of opinion that there was some foundation for the tradition that Arab intercourse had existed from the days of the early Phœnician traders. Such tales as those of the enormous roc, whose feathers were 30 feet long, had their origin in the stories brought home by Arab travellers to the Madagascar coast. Why this intercourse was interrupted so completely was one of the curious problems of history, which, no doubt, some of Dr. Mullens' friends would in time elucidate. Apparently, from the date of the commencement of European domination in the neighbouring seas, Madagascar declined in civilisation; but when, about the beginning of the present century, interest was again attracted to the country by a Scotch gentleman, who first induced the missionaries to go there, a slow awakening again commenced, and of late years it had been accelerated in a most extraordinary manner. When it was remembered that a written European character had been given to the language, that books had been printed in the native

language, that the country had been opened up to missionaries, that the governing classes had been brought over to the side of Christianity, and that European travellers could now pass through all parts of the island, it must be acknowledged that a tolerably good piece of work had been done in one generation. Indian traders had again begun to resort to the coasts. At Mojunga he found as many as forty houses belonging to Muhammadan traders of Indian origin, and having their headquarters in India. In this way the country was being penetrated in every direction, and it offered one of the most tempting fields for discovery that were now open. Naturalists would there be rewarded by finding the remains of animals now extinct, and the flora was also very interesting. A great part of the island was still a blank as far as the map was concerned, and discoveries might possibly yet be made as great as those which had rewarded the exertions of the missionary travellers. He hoped that among other channels for doing good, the missionaries would not forget to prosecute geographical investigations, in which they had already so successfully laboured.

The PRESIDENT, in conclusion, said the Paper had deeply interested him, as showing how geographical exploration led by a natural and simple process to the introduction of Christianity and civilisation. That was the legitimate course of things, and it was most gratifying to hear how kindly and well disposed the natives were. They even exceeded the old Castilian Hidalgo's hospitality, when the whole house was placed at the disposal of a visitor, for in Madagascar, the natives said to strangers, "The whole town is yours," and they provided everything that was required. He should be very sorry to think that the old influences that used to prevail in Madagascar would ever turn the kindly blood of these people into the viciousness that had been developed elsewhere. Certainly the progress made in the present generation was most encouraging and gratifying. The desire of the people for improvement was one of the most hopeful symptoms. No doubt it was rather unpleasant walking to the village of Aviavo, and having thirty leeches adhering to the foot; but after all the village itself appeared to be a pleasant place, and visitors had a pleasant reception. The paper showed how much might be done when a right course was adopted, and when there was a continuous effort to carry the beneficial influences of civilisation, apart from its vices, into the midst of a simple and comparatively uncivilised people. There was no more encouraging example, in the whole course of missionary enterprise, than that presented in Madagascar since, in 1816, Sir Robert Falconer, the then Governor of Mauritius, first attracted the attention of England to the island as a promising field for missionary exertion.

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PARIS GEOGRAPHICAL SOCIETY.

December 6th, 1876.—M MALTE BRUN in the chair.—M. BABINET asked whether there was any truth about the discovery of a branch of the Nile flowing towards the north-west. M. MAUNOIR said that Colonel Gordon, in the correspondence he had carried on with him, had said nothing to confirm the assertion.

M. G. REY read a letter received from Commandant L. Chambeyron, in which were described the coral reefs and islands of New Caledonia.

M. VIOLET D'AOUST read a paper on the mountain systems of Central America, and the dust whirlwinds observed by him on the plains of Mexico.

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January 3rd, 1877.—M. MALTE-BRUN in the chair. M. GEORGES BIARD announced that the Society for organising "Voyages d'études" around the world had now been established, and that the first expedition would start in May next.

MM. DECHY informed the Society that a copy of the magnificent planisphere by Pierre Descellier, which had attracted so much attention at the Geographical Congress, was being prepared by him.

M. LUCAS DE PESLOUAN announced his approaching departure for Buenos Ayres.

Mr. D. H. T. MOSSE, of San Francisco, in criticising Captain Roudaire's scheme of creating an inland lake to the south of Algeria, said that the displacement of the water required to fill this lake of 6250 square miles would result in a shifting of the earth's axis!

Several communications bearing upon the expedition of MM. Largeau and Say were read. The Agha of Tugurt promised to assist these explorers to the best of his power. General Chanzy, the Governor of Algeria, thought that in consequence of the events now taking place in Turkey, the moment for attempting to penetrate amongst the fanatical Muhammadan tribes of the Sahara was ill-chosen.

M. Largeau has bound himself not to assume the character of an agent of the French Government, nor to meddle with the politics or the religion of the tribes whom he may visit. He proposes to spend the coming summer in the Algerian Sahara.

M. RAFFRAY, the entomologist informed the Society that he is about to leave Java for Celebes and New Guinea.

M. DUVEYRIER read a letter received from Dr. Holub, at present in South Africa. That traveller has explored the country between Natal and the Zambesi; he claims to have ascertained that there are five species of elephants and numerous species of rhinoceros in Southern Africa.

Captain DU TREUIL DE RHINS, in command of one of the King of Anam's steamers, informed the Society that he has surveyed the harbour aud river of Hué. That city stands on an island, and was fortified by Colonel Ollivier during the last century. It is surrounded by a square wall, each side of which has a length of 7316 ft. and defended by a ditch 130 ft. wide, and by a glacis sloping down to the river, which is from 130 to 660 ft. in width.

M. BLANCHET explained his scheme of an interoceanic canal across the Lake of Nicaragua.

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January 17th, 1877.—M. E. LEVASSEUR in the chair. The President announced that the receipts during last year amounted to 68,937 frs., and the expenditure to 63,253 frs. The ministry of education had granted them an annual subsidy of 1000 frs. in return for 50 copies of their *Bulletin*.

M. A. GERMAIN reminded the meeting that, on the 15th of March last, he had placed before them a Memoir by Colonel Coatpont, which recommended the introduction of Lambert's Equivalent Zenithal Projection when it was a question of representing an extensive portion of the globe. He now placed before them a map of Asia and Europe, drawn on that projection. Lambert's Zenithal Projection resulted in a far less amount of distortion than did those of Sanson or Bonne, ordinarily employed in our maps of continents. He thought that the compilers of maps had not hitherto sufficiently considered the advantages which particular projections offered, and should like to see a greater variety introduced into our atlases.

M. LEVASSEUR concurred. The zenithal projection certainly possessed great advantages in many instances.

M. LEUILLET announced the receipt of twelve plans of stations on the east coast of Madagascar, which he had explored last year. He was engaged at present in preparing an account of his explorations.

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January 26th, 1877.—Admiral DE LA RONCIERE in the chair. The President stated that the meeting had been convened in order to welcome Captain V. Lovett Cameron, the only European, with the exception of Livingstone, who had traversed the whole of Africa from east to west.

Captain CAMERON then gave an account of his explorations, in French. He was frequently interrupted by applause, and before separating the president announced that the gold medal of the Society had been awarded to the intrepid explorer.

On the 27th, Captain Cameron was entertained at a dinner, when the bill of fare included fillet of venison *à la Kassongo* and lobsters *à l'Africaine*.

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GEOGRAPHICAL SOCIETY OF LYONS.

December 2nd, 1876.—M. DUFONCHEL explained his scheme of a Saharan railway, which was to connect Algeria with Timbuktu. The Sudan had no less than fifty millions of inhabitants, and a climate equal to that of Bengal or the Brazils. Yet, its exports were only trifling, for everything had to be carried on the backs of camels or of men, and the cost of transport was extravagantly high. At Tuat three loads of dates were given in exchange for one of barley, whilst at Algiers the reverse was the case, one load of dates being equivalent to three loads of barley. A railway, affording facile means of transport, would reduce these differences to a minimum, and all the world would profit thereby. The sands of the Sahara, it was said, would overwhelm the proposed railway, but the same thing had been said about the Suez Canal, and this difficulty could be overcome by engineers. Artesian wells would furnish an ample supply of water.

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BORDEAUX SOCIETY OF COMMERCIAL GEOGRAPHY.

THE annual meeting was held on the 29th of January. M. MARC MAUREL, the President, felicitated the members upon the support which they had received from the Chamber of Commerce. He recommended the proposition that young merchants should be permitted to visit foreign ports on board a government vessel, as tending to the development of French commerce. From the Report read by Dr. AZAM, it appears that the work of the Society has almost exclusively been directed to local questions. Industrial, geological, and agricultural maps of the Department have been published by it; prizes have been offered to local schools; scientific excursions have been made; questions calculated to promote the commerce of Bordeaux have been considered, and there have not been wanting instructive lectures on a variety of geographical subjects.

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VIENNA GEOGRAPHICAL SOCIETY.

Annual Meeting, December 12th, 1876.

The meeting was exclusively engaged upon the re-election of the Council and various business arrangements. Professor von Hochstetter remains president. It was resolved, with a view to an improvement of the financial position of the Society, to create a class of "Extraordinary members," paying an annual subscription of 10 florins.

Professor von Hochstetter's report on the progress of geography, will appear in the January number of the *Mittheilungen*, but was not read.

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HAMBURG GEOGRAPHICAL SOCIETY.

February 1st, 1877.—Dr. HARMS in the chair. Herr FRIEDRICHSEN gave an account of the explorations of Dr. Lenz and Dr. Pogge, who had returned to Hamburg on the 27th January, and read a letter from Herr Mohr, dated Dondo, October 9th.

Dr. HARMS read a necrological notice on the late Professor Poggendorf, born at Hamburg, December 29th, 1796, died January 24th, 1877.

Professor SADEBECK read a paper on the genetical connection between the vegetation of the Polar Regions and the forest regions of the northern hemisphere.

Herr CRAMER exhibited relief maps of the Grindelwald and the St. Gothard, and Herr WICHMANN a manuscript map of the British Islands, which figured in last year's International Exhibition at Kensington.

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EGYPTIAN GEOGRAPHICAL SOCIETY.

February 2nd, 1877.—General STONE-PASHA in the chair. The Marquis DE COMPIEGNE said that the moral influence of the Society was steadily on the increase. Their scientific collection had been enriched by weapons and other articles presented by officers of the staff. Their financial position was not very satisfactory, and out of 240 members residing at Cairo, only forty had paid their subscription.

Signor ROSSI read a paper on the Civilisatory Mission of Egypt with respect to Central Africa. Egypt, thanks to the efforts of Mehemet Ali and the present Khedive, could take its place now amongst the civilised countries.

Major Mokhtar Efendi, one of the officers attached to Rauf Pasha's Expedition, read a paper on Harar and the Somali Coast. The Somali tribes subject to Egypt he estimates at 130,000 souls, the Isas being the most powerful amongst them. They are nomads, and are supported almost exclusively by breeding camels. Harar stands on a hill, commanded by Mount el Hakem, bounded on the south-west by the hills of Galla Garse, and on the north-west by Shoa. Its territory is 186 square miles in extent. The town is surrounded by a wall with twenty-four crenellated towers. It lies at an elevation of 5582 feet above the sea, and its climate is healthy. The rainy season begins on the 15th March and lasts for six months, the rainfall being most considerable during June. The inhabitants are Mussulmans, of gentle manners, but avaricious. Education is carefully attended to. There are public schools for the children, and adults attend classes held by the Kadi. Women are respected, and though bigamy is permitted by law, it is but rarely practised, and divorce is hardly ever resorted to. Durra is the principal article of food. Wheat, maize, lentils, beans, cotton, aniseed, barley, and sesamum are cultivated, but coffee is the principal crop, and is said to be superior to that of Mokha. The sugar-cane, pomegranates, grapes, oranges, lemons, and tobacco are likewise grown. Much progress has been made in industry, particularly in the manufacture of arms, in weaving and bookbinding.

M. DE LESSEPS gave an account of the great engineering works completed in the course of the nineteenth century, and expressed a hope that before its close the Panama Canal, the great Asiatic railway, and the creation of an inland lake to the south of Algeria would be accomplished.

NOTICE.

The Office of THE GEOGRAPHICAL MAGAZINE *is at* 57 & 59, *Ludgate Hill, E.C.*

Manuscripts sent to the Editor cannot be returned, nor can the Editor be responsible for them.

Letters and Articles intended for insertion should be written on one side of the paper only, and must be accompanied by the name and address of the writer; not for publication, but as a mark of good faith.

The right of translation is reserved.

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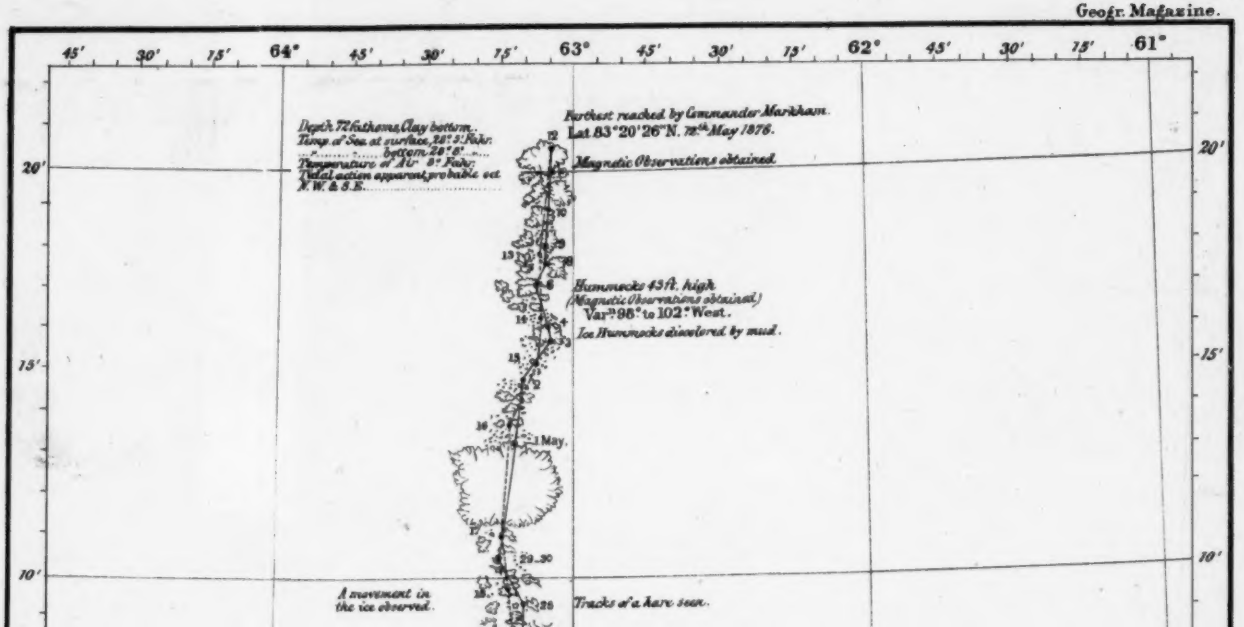
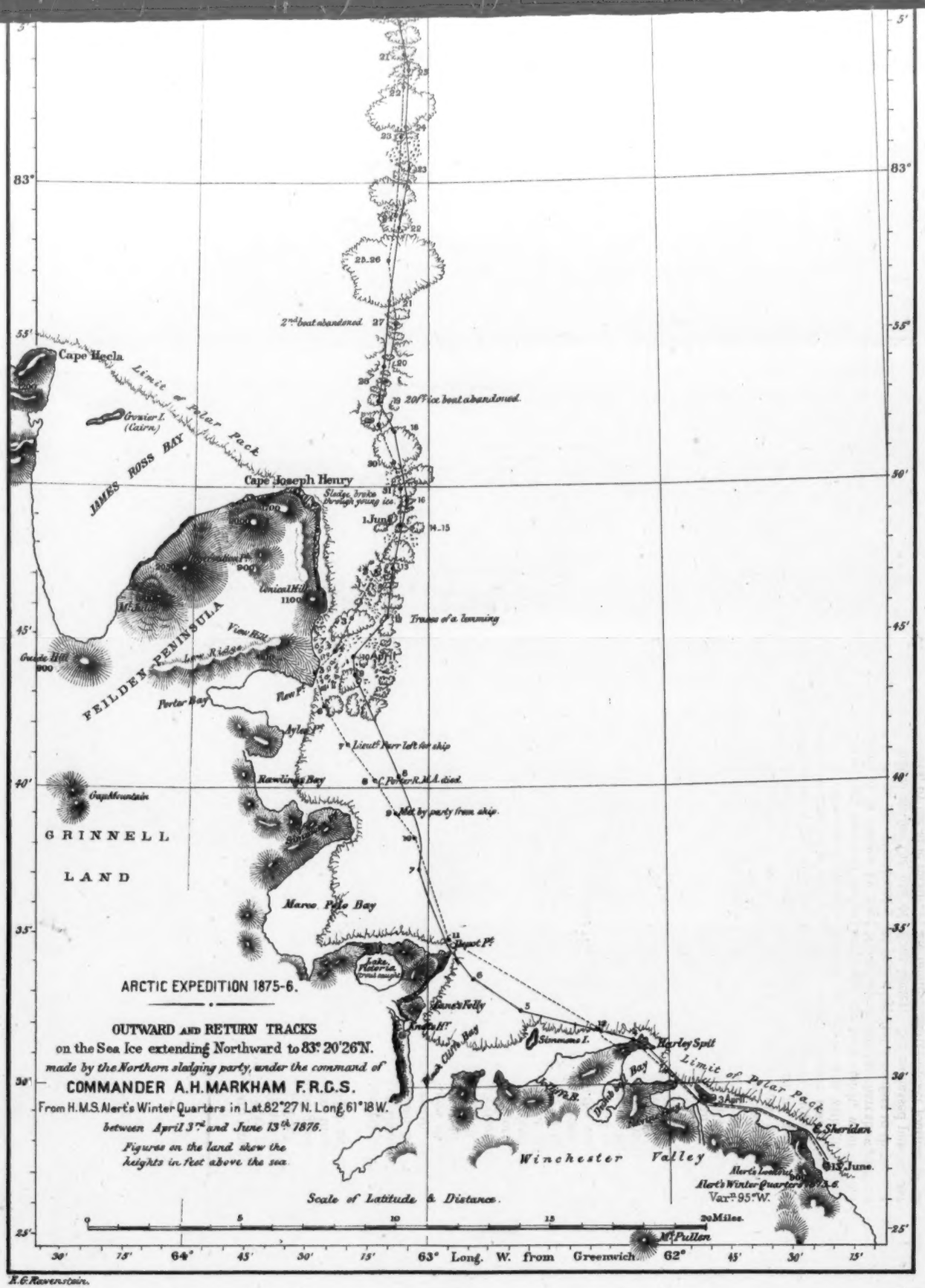

45' 30' 15' 64° 45' 30' 15' 63° 45' 30' 15' 62° 45' 30' 15' 61°
20'
15'
10'
Depth 72 fathoms, Clay bottom.
Temp.r of Sea at surface, 28°.2 Fahr.
" " bottom 29°.6 "
Temperature of Air 8° Fahr.
Tidal action apparent; probable set.
N.W. & S.E.
Furthest reached by Commander Markham.
Lat. 83°20'26" N. 18th May 1876.
Magnetic Observations obtained.
Hummocks 45 ft. high.
(Magnetic Observations obtained.)
Var.n 98° to 102° West.
Ice Hummocks discovered by mud.
1 May.
A movement in the ice observed.
Tracks of a hare seen.

A movement in the ice observed.
Tracks of a hare seen.
5'
83°
55'
2nd boat abandoned 27
Cape Hecla
Limit of Polar Pack
Grozier I. (Cairn)
JAMES ROSS BAY
20th ice boat abandoned
Cape Joseph Henry
Sledge broke through young ice
1 June
14.15
Tracks of a lemming
45'
50'



E.G. Ravenstein.